

**Department of Defense
Annual Report to Congress on
Defense Acquisition Challenge
Program for FY 2006**



**Deputy Under Secretary of Defense
(Advanced Systems and Concepts)**

June 2007

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FOREWORD

Defense Acquisition Challenge (DAC) is an exciting initiative, authorized by Congress through the enactment in 2002 of 10 U. S. C. 2359b. DAC helps introduce innovative and cost-saving technology and products into existing Department of Defense (DoD) acquisition programs through proposals for warfighter adoption of non-developmental items.

Industry and DoD submitted 226 proposals in response to the January 2006 Broad Agency Announcement. Proposals were reviewed at two levels. The initial review by engineers and acquisition managers in the Military Services and U.S. Special Operations Command (SOCOM) resulted in 53 proposals submitted to the Office of the Secretary of Defense (OSD). A final assessment by a team of OSD subject matter experts recommended eighteen new-start projects approved for fiscal year (FY) 2007 funding: five sponsored by Army, five by the Navy/Marine Corps, four from the Air Force, and four by SOCOM. Thirty-four projects (eighteen new-starts, sixteen continuing) are funded in FY 2007, at a value of \$27.3 million.

Transition results from the sixty-eight projects initiated from FY 2003 to 2006 are assessed as projects are completed. The average return-on-investment for the completed projects is ten to one. In FY 2006, fourteen projects were completed: eleven met Service or Agency testing requirements; four projects were terminated due to inability to satisfy testing or Program of Record priorities. To date, fourteen projects have yielded technology currently in use by our warfighters in Iraq, Afghanistan, or at U.S. training facilities.

The DoD is pleased to submit this report highlighting the FY 2006 DAC program results. As you will see, DAC continues to facilitate domestic industry entry into current DoD acquisition programs and transition innovative, leading-edge technologies to the warfighter.

John J. Kubricky

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Deputy Under Secretary of Defense
(Advanced Systems & Concepts)

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PROGRAM OVERVIEW

The Defense Acquisition Challenge (DAC) provides funds for the test and evaluation of technologies and products with potential to improve current acquisition programs at the component, subsystem, or system level. Any person or activity within or outside the DoD has the opportunity to propose alternatives, known as “Challenge Proposals,” which would improve performance, affordability, manufacturability, or operational capability of that acquisition program. These proposals increase the introduction of innovative and cost-saving technology into acquisition programs of the Department of Defense.

DAC has a proposal selection cycle lasting one year, from a published Broad Agency Announcement (BAA) for draft proposals to final proposals submitted by program managers who compete for funding. The CTO and subject matter experts (from across the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics) evaluate and prioritize candidate proposals for funding, with highest priority given to proposals that commit to procurement should testing be successful. The Services or U.S. Special Operations Command conduct the technology/project evaluations and procure those items that meet their requirement(s).

DAC increases opportunities for domestic vendors to enter the DoD acquisition process. Although business size is not an evaluation criterion, it is noteworthy that to date approximately 70 percent of the DAC projects awarded are with technology providers at the small or mid-sized enterprise level. DAC has the additional DoD/National Security benefit of expanding the industrial base for defense acquisition.

Direction and oversight of DAC is provided by the Office of the Deputy Under Secretary of Defense for Advanced Systems and Concepts (ODUSD(AS&C)) Comparative Testing Office (CTO). DAC projects are managed and executed by the Military Services and SOCOM.

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PROGRAM HIGHLIGHTS

Summary of Achievements

DAC was assigned to ODUSD (AS&C) in March 2003. DoD leveraged existing Service infrastructure and business practices from the established Foreign Comparative Testing Program. Within nine months, the CTO had completed implementation, from initial legislation to contracts for testing products. Proposals were submitted through a secure *e-business* process, with safeguards for handling proprietary information, which also managed procedures for proposal evaluation, project status notification to submitters and program managers, and project management.

The program has multiple objectives:

- Introducing and improving new operational capabilities
- Offering leading edge/leap-ahead technologies with cross-cutting applications
- Creating new opportunities for U.S. industry teaming
- Assisting the bridging of a technology gap in DoD acquisition programs
- Facilitating rapid fielding of critical equipment for the Global War on Terrorism
- Measuring progress, including: risk reduction for technology insertion, cost avoidance, avoiding new research and development expenditures, speeding transition of mature technology to programs of record (PoR), and tracking return on investment

DAC projects cover a broad range of technologies responding to the diverse warfighter needs of the Military Services and SOCOM. The Program's focus on a clear path to procurement quickly puts needed equipment into the hands of America's warfighters, while evaluation of late-stage mature technologies and commercial items avoids research and development costs. Procuring a commercial item already in production or mature technology nearing market application can lower the unit procurement cost for both the U.S. defense and commercial industry.

Responding rapidly to our nation's immediate warfighting and peacekeeping requirements has remained the central concern of the DoD. Examples of DAC technologies deployed during warfighting for critical operational needs (as identified from Operation Iraqi Freedom (OIF)) are:

- **SprayCool™ Counter Targeting System / Weapon Surveillance System (CTS / WSS)** - Increased the availability of counter targeting sensor electronics in extreme heat and blowing sand environments.
 - SprayCool™ technology allowed 82% weight and 92% size reductions of electronic systems by hermetically sealing the electronics in a “spraycooled” enclosure impervious to moisture and dust thereby virtually eliminating daily system failures that were experienced with parent system.
 - Four systems were deployed to Iraq in summer of 2004, supporting the Persistent Threat Detection System for surveillance and defense against Man-Portable Air Defense Systems (MANPADs) and mortar attacks. An additional test bed system was deployed at Redstone Arsenal, Alabama.
 - The infrared (IR) detection technology is a primary component of Pacific Command’s OVERWATCH Advanced Concept Technology Demonstration.
 - While the current units are still operational, SprayCool™ CTTS/WSS has since been superseded with newer technology focal plane gate arrays.
- **Enhanced Gunfire Detection System (EGDS)** - A spiral development by SOCOM is underway to build upon the already successful Foreign Comparative Testing program establishing an acoustic detection capability for snipers. This enhanced system, having competed against seven domestic vendors, adds sensors, processors and automated processing elements to locate a threat prior to the sniper’s first shot. A prototype system has already been fielded. Feedback from the 116th Brigade Combat Team Logistics Assistance Representative (April 2005) reported:

...[O]ne week after the EGDS was set up in an operational high risk area of Iraq, rounds were fired by insurgent snipers at soldiers in the camp. The EGDS performed as advertised and identified distance and bearing of the fire. Subsequent search of location resulted in the capture of insurgents and weapons. No U.S. soldiers were injured.
- **Automated Enhanced Position Location Reporting System (EPLRS) and Quality of Service (QoS) Planners for the Systems Planning Engineering and Evaluation Device (SPEED)** - Two parallel DAC projects automated the planning processes for EPLRS networks and dedicated QoS to specific communication network assets. This reduced the communications planning time for a tactical deployment from one day to twenty minutes by enabling faster insertion of SPEED v10.0 software application. SPEED was designed to provide communicators with a standard set of tools to perform radio link engineering.
 - The Marine Corps deployed a tactical release of SPEED v10.0, including the EPLRS and QoS modules, to 900 users in support of the Marine Expeditionary Force (MEF) II Iraqi deployment in the fall of 2005.
 - Awaiting Navy / USMC qualification for full release to all SPEED users.

- **Enhancements to Fly Away Satellite Communications (SATCOM)** - Since the summer of 2003, the Fly Away SATCOM System has been employed in the mountains of Afghanistan and the deserts of Iraq.
 - Operational testing of the new built-in test capability and improved earth station identification/improved FA-150 1.5 meter antenna is being accomplished by SOF elements for overseas user evaluation.
 - Further user evaluation testing of the 1.5 meter antenna “auto-locate” function was conducted by SOF elements in Iraq and created an overwhelming buy-in, leading to a USMC procurement of five additional systems.
- **Mini Combat Trauma Patient Simulation System (Mini CTPS)** - Improves the skills of combat medical personnel deployed forward, in mass casualty and triage, which increases warfighter survivability through quicker assessments of battlefield casualties. Over 3500 medics and corpsmen have been trained with this simulation system. Additionally, with the Mini-CPTS the academic attrition rate of trainees has dropped from 23% to 6% -- testimony to the effectiveness of this training tool.
- **MK-46 Machine Gun Semi-Rigid Ammunition Containers** - Semi-rigid carriers provide quieter ammo carry under covert conditions. They are more durable than previously standard containers; SOF world-wide protect linked ammunition for the M249 Squad Automatic Weapon with them.
- **Dismounted Infantry Virtual Simulation for Military Operations in Urban Terrain (MOUT)** - Virtual MOUT training system immerses the warfighter in a networked simulation. The 101st Army Airborne Division trained Soldiers rotating to Iraq at Ft. Campbell with this system.
- **Weapons Shock Profile Database** - Developed a digital live-fire profile for small arms SOF weapon systems, including the profiles that aid testing and qualification of new weapons accessories at the Naval Surface Warfare Center, Crane, Indiana.
- **Common Tactical Picture Ground Mobile and Air Based Command and Control System** - Provides first ever on-the-move technology for the USMC expeditionary assault vehicle, deployed to Iraq in fall 2004.
- **Secure Army Wireless Intercom System** – Decreases risk of mission compromise, increases mission effectiveness and soldier safety, and eliminates interception of communications between aircrews and ground stations.
- **Low-Frequency Synthetic Instrument Measurement and Stimulus System** – Improves aircraft avionics and electronic attack pod testing to expedite repair of critical assets during deployed/home base operations.

- **Embedded Integrated Broadcast Service Receiver** – Provides tactical warfighter with near-real-time intelligence data reception for situational awareness and threat detection and avoidance.
- **Second-Generation Rail Interface System for M-4 Carbine** – Second-generation rail allows SOF operators to mount various lights, lasers and sighting devices to their weapons.
- **Portable Continuity of Operations Communications Appliance** - Combines a continuity of operations solution with rapid deployment in communications with both the primary and back-up servers, and provides seamless Quality of Service to critical users during an emergency, regardless of where they are physically located.

Participation in DAC

Participation from U.S. vendors/industry and DoD acquisition programs to DAC has been exceptional for a pilot program. The size of response demonstrated a clear need in both government and industry for an avenue to consider emerging technologies without risking discretionary program research and development funds. Although only in its fifth year, DAC program funding has supported 68 projects to date, not including the eighteen new initiatives approved for FY 2007. A Broad Agency Announcement was initiated in January 2006 with the following results:

- 226 draft proposals were evaluated and prioritized based on potential and reviewed by acquisition Programs of Record.
- 53 final proposals were submitted by Program Managers to compete for funding.
- 18 new start projects have been selected for FY 2007 new start funding.

A total of thirty-four projects (eighteen new-starts, sixteen continuing) are funded in FY 2007, for a value of \$27.3 million.

PROJECTS COMPLETED IN FY 2006

Listed below are fourteen projects funded with FY06 or prior funds which have completed testing and evaluation under the DAC program in FY06:

- Eleven met Service or U.S. Special Operations Command testing requirements
- Nine projects tested successfully and are being procured
- One tested successfully and is awaiting procurement decisions
- Four projects were either terminated due to failure to satisfy testing requirements, or the PoR revised priorities and/or the technologies were no longer needed or deemed viable.

Table 1. DAC PROJECTS COMPLETED IN FY 2006

Service / Agency	Project Title	Status
Army / (4 Projects)	<ul style="list-style-type: none"> • SprayCool™ Counter Targeting System • Enhanced Simulation Capabilities for Testing and Training • Secure Army Wireless Intercommunications System • Transcritical CO2 Environmental Control System 	<ul style="list-style-type: none"> • Met requirements / deployed in support of OIF • Met requirements and is being transitioned • Met requirements / transition to Army platform • Met requirements / transition to Future Tactical Truck System
Navy / Marine Corps (3 Projects)	<ul style="list-style-type: none"> • Advanced Rugged Mobile Enclosure • SprayCool™ Technology for Close-In Weapon System (CIWS) Power Amplifier • Wavelength Division Multiplexing (WDM) Fiber Optic Global Positioning System (GPS) Anti-Jam Antenna 	<ul style="list-style-type: none"> • Unsuccessful/ Not procured • Met Requirements / Adopted for integration into CIWS • Navy requirement Cancelled / Not procured
Air Force (4 Projects)	<ul style="list-style-type: none"> • Quiet Eyes • On Aircraft (B-2) Laser Additive Repair • Global Transponder Improvement Using COTS Digital Video Broadcasting (DVB) • Low Frequency Synthetic Instrument Measurement and Stimulus System 	<ul style="list-style-type: none"> • Met Requirement/Rolled into FY07 Cost Effective Light Aircraft Missile Protect DAC for Army, Navy and Air Force helicopters • Did Not meet requirement/Terminated • Met requirement/Joint Internet Protocol Modem Program procuring • Met requirement/Being procured and deployed
Special Operations Command (3 Projects)	<ul style="list-style-type: none"> • Second-Generation Rail Interface System for M-4 Carbines • Embedded Integrated Broadcast Service (EIBS) Receiver • SOPMOD Weapons Shock Profile Database 	<ul style="list-style-type: none"> • Met Requirements / Being Procured & Deployed • Met Requirements / Awaiting Procurement Decision • Met Requirements / Being Procured & Deployed

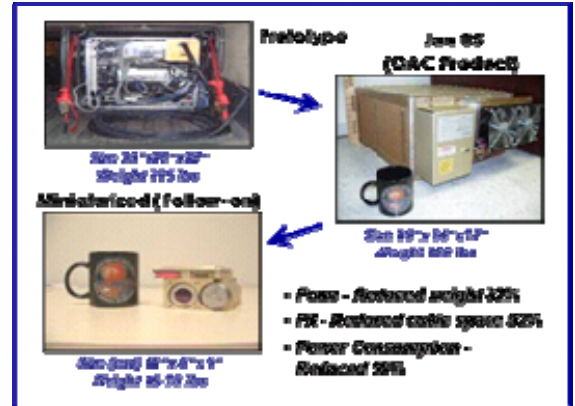
ARMY

SprayCool™ for Counter Targeting System for Counter Sniper Detection

Sponsor: Army Intelligence and Security Command

Vendor: Isothermal Systems Research Corp., Liberty Lake, Washington

This project evaluated new technology for spiral development of the Counter Targeting System (CTS): an IR sensor at high frame rates to detect sniper, mortar, rocket-propelled grenade, and large caliber weapons fire. This system assists in near real-time targeting and situational awareness for direct support of combat troops in operations such as Iraq and Afghanistan. Spraycool™ technology provides weight and volume savings over traditional air cooled systems and operates in harsh environments of high temperature, high humidity, and dust with increased reliability. CTS weight is reduced 80 percent, from 335 pounds to less than 100 pounds. Testing was conducted by Army Intelligence and Security Command, Ft. Belvoir, VA. **Status:** Four units were deployed to OIF during summer 2004 and operated very successfully in support of the Persistent Threat Detection System. An additional test bed system is at Redstone Arsenal, AL. No further procurements planned.



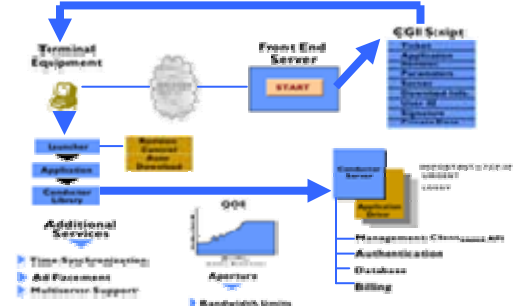
Enhanced Simulation Capabilities for Testing and Training

Sponsor: PEO Simulation, Training and Instrumentation (STRI)

Vendor: Circadence Corporation, Boulder, Colorado

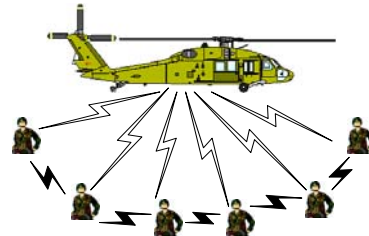
This technology allows distributed interactive simulations (DIS) in large-scale scenarios with real-time requirements. COTS technology provides software architecture that can network legacy DIS simulations. A tested conductor platform enables large-scale scenarios to be integrated with real-time requirements and provides ability for field units to participate in simulation. Testing was conducted by PEO STRI, Redstone Arsenal, AL.

Status: Achieved 50% to 80% compression of the DIS data, an extraordinary success in light of expectations of only 20%. Thirty units were procured with licenses and software worth approximately \$2.9M. Additional contracts expected. The cost savings from this program are: RDT&E cost avoidance \$12M, Procurement savings \$100M, Operation and Support Life-cycle savings \$10M, and Manufacturing savings \$5M. Total cost avoidance \$127M.



Secure Army Wireless Intercommunications System (AWIS)**Sponsor:** Army PEO Soldier/PM Air Warrior**Vendor:** Telephonics Corp., Farmingdale, New York

Current unencrypted communication systems can compromise security. AWIS is a secure wireless intercom system for close-range communications in aviation operations. AWIS was modified to include encryption via approved embedded integrated circuits and /or firmware. This change expands the intercommunication system to sensitive operating areas and provides compatibility with planned secure wireless communications systems among joint services applications. The resulting elimination of communication intercepts between aircrews and ground stations decreases the risk of mission compromise and increases mission effectiveness and Soldier safety. Testing was conducted by National Security Agency, Army's PEO Soldier / PM Air Warrior, and Telephonics Corp., Farmingdale, NY. **Status:** Qualified. PM Air Warrior and the Navy's PMA 209 decided on a full development program to implement the technology for their crew-served rotary wing fleets. Procurement of 2,600 systems (Army) and 500 systems (Navy) are anticipated to begin in FY09, using programmed funds. This project resulted in an estimated development schedule reduction of 18 months.

**Transcritical Carbon Dioxide (CO₂) Environmental Control System****Sponsor:** Army PM-Light Tactical Vehicles, PEO Combat Support and Combat Services**Vendor:** Modine Manufacturing, Harrodsburg, Kentucky

For worldwide operation of its vehicles, the U.S. Army must replace harmful synthetic refrigerants to meet international environmental protocols. CO₂ is a refrigerant vital to sustaining higher-performing Environment Control Units in up-armored and standard High Mobility Multi-Purpose Wheeled Vehicles (HMMWVs) receiving field armoring kits. Other benefits include:

- 1) reduction of greenhouse gas emissions;
- 2) elimination of costly EPA-compliant refrigerant recovery operations and associated training; and 3) a smaller size, reduced-weight system for the legacy fleet, including the Future Tactical Truck System and the Future Combat System. Testing was done at Ft. Belvoir, VA, and in Death Valley, CA. **Status:** The technology will be implemented through the Future Tactical Truck System (FTTS). This program includes the FTTS-Utility Vehicle (UV), designed as the future replacement of the current HMMWV family of light tactical vehicles. The prototype FTTS-UV (built by the International Truck and Engine Corporation) has a Modine Transcritical CO₂ system. There are 12-, 24-, and 36-month plans to initiate production.

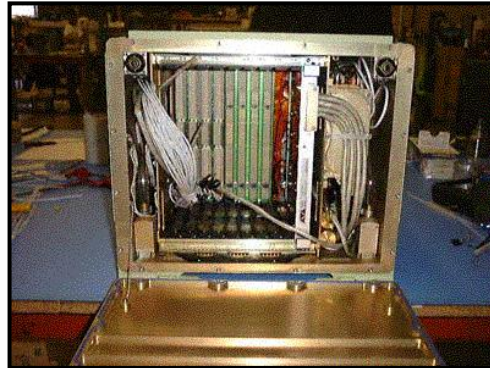
An Army standard ECM modified to use CO₂ as the sole refrigerant



An Up-Armored HMMWV using the current Army standard cooling system appears on the left. The HMMWV on the right is equipped with a CO₂ cooling system.

NAVY AND MARINE CORPS**Advanced Rugged Mobile Enclosure (ARME) for the EFV****Sponsor:** DRPM AAA (EFV / Woodbridge, VA)**Vendor:** Isothermal Systems Research, Inc., Liberty Lake, WA

The USMC must integrate multiple coordinated Army Fire Zone and USMC blue and red force databases to provide a ground, mobile Common Tactical Picture (CTP). EFV will integrate spray cooling technology into the C4I Advanced Rugged Mobile Enclosure (ARME) of the EFV(C) and EFV (P) variants. The ARME will integrate COTS computer technology through spray cooling to provide on-the-move capability, protection from harsh environments, ready integration with satellite communications, and much faster processing times over ruggedized military computing equipment. Limited Technical Assessments of ARME units were tested by the Marine Corps Warfighting Laboratory within the Command Operation Center in Scottsdale, AZ; the Command and Control On-the-Move Network Digital Over-the-Horizon Relay program, demonstrated in the Amphibious Assault Vehicle; and the Light Armored Vehicle Program. Full Qualification Testing for full thermal characteristics, vibration, and shock was conducted by the Defense Microelectronics Agency **Status:** The ARME was unable to meet thermal performance parameters and in one instance catastrophically failed. Unsuccessful / Not Procured

**SprayCool™ Technology for Close-In Weapon System
(CIWS) Power Amplifier****Sponsor:** Naval Sea Systems Command**Vendor:** Isothermal Systems Research (ISR), Inc., Liberty Lake, WA

A SprayCool™ solution converts the CIWS power amplifier section from an air-cooled system to efficiently dissipate heat and improve system reliability.

Spraycool™ encloses the electronic circuitry cards in hermetically sealed aluminum housing with a closed-loop cooling system. This allows flexibility in COTS circuit card replacements, offers weight and volume savings, and enhances

system operation in harsh environments (high temperature, high humidity, and dust). In this testing, SprayCool™ reduced the electronics chassis footprint and increased the mean time between failures of each device from 2,800 to 11,524 hours. Testing was performed by NAVSEA PEO-IWS and Raytheon, Missile Systems. Estimated cost avoidances: RDT&E (\$37 million), Life Cycle Cost Reduction (exceeds \$60 million). *Note: ISR won the DoD Value Engineering award for cost reductions targeted for the Marine Corps' EFV.* **Status:** Qualified. Will be incorporated in the receiver section and follow-on production buys.



Wavelength Division Multiplexing (WDM) Fiber Optic GPS Anti-Jam Antenna**Sponsor:** SPAWAR PEO C4I (PMW/A-170)

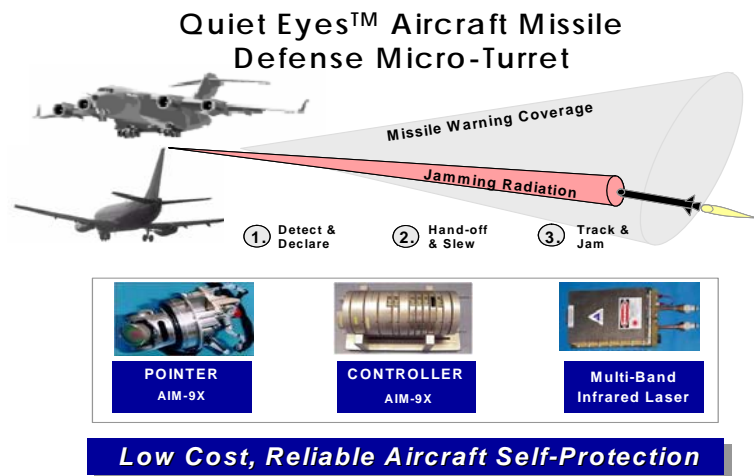
Vendors: Gould Fiber Optics, Millersville, Maryland
 Optiwork, Fremont, California
 Tempo Research, Camarillo, California
 Fiber-Span, South Plainfield, New Jersey

The objective was to validate Wavelength Division Multiplexing (WDM) COTS technology ability to transmit multiple Radio Frequency (RF) signals through a single optic fiber. WDM technical considerations were performance, reliability and cost. WDM technology with shipboard GPS anti-jam antenna assembly could relocate the Antenna Electronics (AE) below deck and minimize electro- magnetic interference, shock and vibration, and temperature extremes, provide access for equipment upgrades and allow maintenance at-sea. Possible topside weight savings are approximately 10 to 15 pounds, and integration on additional platforms adds no changes to the AE interface or adverse effect on system performance. **Status:** Complete. The decision was to not to procure GAS-WDM units for shipboard fielding because of much higher than expected reliability data from the fielded GAS-1 assemblies.

**AIR FORCE****Quiet Eyes™ Low-Cost Directed Infrared Countermeasures (DIRCM) Laser-Pointer-Tracker Demonstration****Sponsor:** AF Large Aircraft Infrared Countermeasures Systems (LAIRCM)**Vendor:** Raytheon Missile Systems, Tucson, Arizona

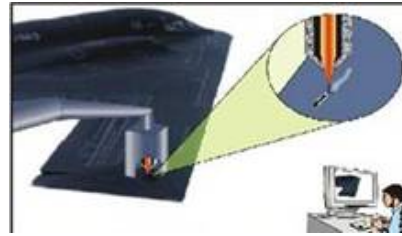
A low-cost IR countermeasures micro-turret was tested for LAIRCM requirements. The micro-turret, a variant of the AIM-9X guidance unit, would improve cost, size, weight, and reliability over the existing turret. The unit in production is fifth-generation IR, with an advanced image-based acquisition and tracking system. Cost avoidance predictions were based on leveraging the lower cost guidance units (more than 3500 seeker assemblies already fielded or in production). **Status:**

Complete. Results met key test objectives and are being rolled into FY07 DAC Project; Cost Effective Light Aircraft Missile Protection



“On Aircraft” Laser Additive Repair of Titanium Components**Sponsor: AF B-2 Systems Program Office****Vendor: Triton Systems Inc., Chelmsford, Massachusetts**

The technology tested is an evolving manufacturing process to automate milling and filling of cracks in damaged titanium aft deck surfaces with micro-welded titanium alloy. This solution allowed for “on aircraft” field repairs of the B-2, vice removal or replacement of large, complex parts at depot level. Benefits included restoration of stealth properties and extended operational life of aircraft



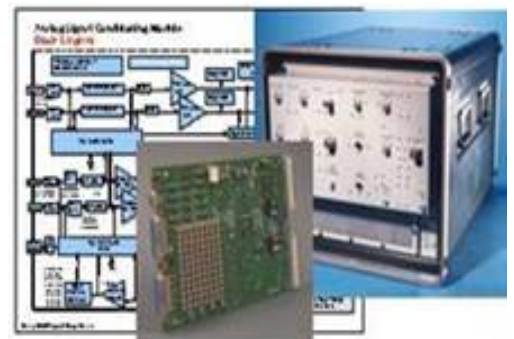
structures. Testing was conducted by Triton Systems, in conjunction with Northrop Grumman and the Air Vehicle Division, B-2 System Program Office. Testing determined that this method was neither cost-effective nor reliable enough to be integrated into the B-2 aft deck repair process. **Status:** Complete. The project did not meet B-2 System Program Office requirements.

Global Broadcasting System Transponder Improvement Using COTS Digital Video Broadcasting (DVB)**Sponsor: AF Global Broadcast Service (GBS) Joint Program Office****Vendor: ECC Inc., Brooklyn Heights, Ohio**

Evaluation of a transitional Air Force Global Broadcast (GBS) waveform DVB-S2 (current waveform is DVB-S). The DVB-S2 waveform provides increased satellite transponder throughput by a minimum of 30 percent, with corresponding decrease in transponder costs (up to \$58 million annually) and added advanced services such as high-definition video and broadband data. Additionally, fewer transponders are needed to satisfy mission requirements, reducing the number of commercial teleport sites required and associated connectivity costs. A new standard also provides more efficient code rate optimization and modulation for specific terminals and enables greater service to smaller terminals. Testing was conducted at Defense Information Systems Agencies Uplink Facility. **Status:** Complete. Exceeded Mission Requirements and will be procured through the Joint Internet Protocol Modem Program starting FY08.

**Synthetic Instrument Measurement and Stimulus Low Frequency (SIMSS-LF) System****Sponsor: AF F-16 System Group****Vendor: BAE Systems Mission Solutions, San Diego, California**

This system consolidates existing signal conditioning functions and incorporates COTS analog-to-digital converters and Digital Signal Processing (DSP) cards to measure electrical signals from zero to ten-megahertz, with amplitudes from microvolt to kilovolts. Replacing traditional measurement instruments with a single DSP-based system reduces hardware and increases the reliability and availability of the test equipment for the warfighter. Additionally, the unit can be updated via software, vice hardware, greatly improving station availability and reducing the need for station downtime. This increases aircraft availability and reduces station enhancement costs during aircraft avionics changes.



Testing evaluated the SIMSS-LF in effectiveness of testing aircraft avionics and electronic attack pods during deployed and home-base operations. Testing was conducted by the 16th Electronic

Warfare Squadron at Eglin AFB, FL. **Status:** Complete. The Project Met Mission Requirements. Awaiting Production Decision.

U.S. SPECIAL OPERATIONS COMMAND

Second-Generation Rail Interface System for M-4 Carbines

Sponsor: SOCOM, PEO Special Operations Forces (SOF) Warrior

Vendor: Daniel Defense, Savannah, GA (Selected)

Knight's Armament, Titusville, FL

A.R.M.S., Bridgewater, MA

The SOF-variant M-4 carbine's rail mount system loses alignment during normal use. An improved rail interface system with the Enhanced Grenade Launcher Module (EGLM) improves rigidity and accuracy. This rigid system allows a free-floating carbine barrel, facilitating cleaning and maintenance of the area between the barrel and the body of the EGLM. This design is more rugged than the current interface. Comparative testing was conducted at the Special Operations Peculiar Modification (SOPMOD) Quality Assurance Test Site, Naval Surface Warfare Center, Crane, IN. **Status:** Success; being procured and deployed.

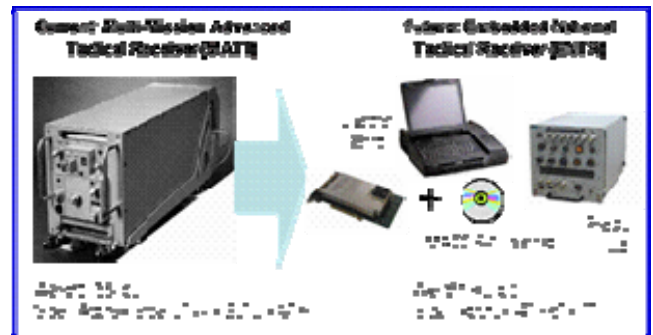


Embedded Integrated Broadcast Service (EIBS) Receiver

Sponsor: SOCOM PEO-Information and Intelligence Systems

Vendor: L3 Communications, Telemetry West, San Diego, California

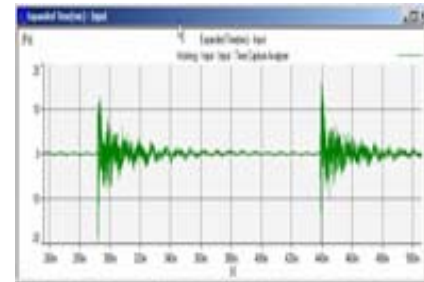
EIBS replaces legacy integrated broadcast service receivers, such as Multi Mission Advanced Tactical Terminal (MATT), significantly reducing size, weight, and costs. It can decrypt up to four independent IBS channels, providing the tactical warfighter with near real-time, intelligence data reception, for situational awareness and threat detection and avoidance. The receiver can be embedded directly into host systems (e.g., radios, laptops, and workstations). Qualification testing was conducted by SPAWAR Systems Center, San Diego, CA; the Air Force Materiel Command; the Joint Interoperability Test Command, Ft. Huachuca, AZ; and the Air Force Operational Test and Evaluation Center. **Status:** Completed; awaiting production decision.



SOPMOD Weapons Shock Profile Database**Sponsor:** SOCOM, PEO SOF Warrior**Vendor:** Bruel and Kjaer Testing Support, Norcross, Georgia

In an effort to limit the costs of maintenance and live-fire testing in developmental, endurance and special initiatives testing, this database was tested to develop a digital live-fire profile for each weapon system in the SOF arsenal. Profiles are replicated to display the effects of firing each weapon when testing accessories (e.g., night-vision scopes, thermal sights, etc.). Digital profiles decrease testing and maintenance costs for SOCOM weapon systems, eliminate expenditure of ammunition and destruction of weapons, and save thousands of man-hours during testing. This profile database is expandable to any weapon system. Qualification testing was conducted by Naval Surface Warfare Center (NSCW), Crane, IN.

Status: Successful / Individual weapons shock profiles are currently being employed by NSWC-Crane for SOF weapons and accessories testing.



PROJECTS CONTINUING INTO FY 2006

This portion of the report details the projects that were started prior to FY2006 whose active testing and/or funding continued into FY2006. Twenty projects are listed below:

Table 2. DAC PROJECTS CONTINUING INTO FY 2006

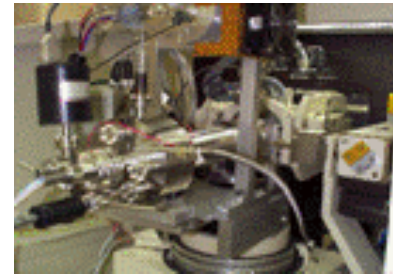
Service / Agency	Project Title
Army (2 Projects)	<ul style="list-style-type: none"> • X-Cor for Aircraft • Superior Surface Treatment Techniques for Adherent Bore Coatings
Navy / Marine Corps (6 Projects)	<ul style="list-style-type: none"> • Affordable Net-Shape Stiffener Forming Technology for F/A18E/F • Composite Twisted Rudder • Friction Stir Processing for Virginia Class Submarines • High Performance Standard Advanced Dewar Assembly • Low Cost Aerogel Insulation for Shipboard Fire and Thermal Protection • Miniature Controlled Receive Pattern Antenna
Air Force (5 Projects)	<ul style="list-style-type: none"> • Integrated Defensive Countermeasures Alternative • Improved Durability F100 Exhaust Nozzle Divergent Seals • Enhanced Military Readiness, Safety, and Personnel Bearing through Pseudofolliculitis Barbae (PFB) Treatment • Qualification of Conformal Fabrics • Restore Effective Survival in Shock
Special Operations Command (7 Projects)	<ul style="list-style-type: none"> • Battery Free Remote Sensing • Enhanced Gunfire Detection System • Collapsible Buttstock and Ammo Containers • Infrared Thermal Friendly Force Identifier • Nickel Boron Coating of Diesel Engine and Drive • Miniature Day/Night Sight Integration • Precision Parachute Delivery System

ARMY**X-Cor as a Replacement for Conventional Honeycomb****Sponsor: Army Aviation****Vendor: Aztex, Inc., Waltham, Massachusetts**

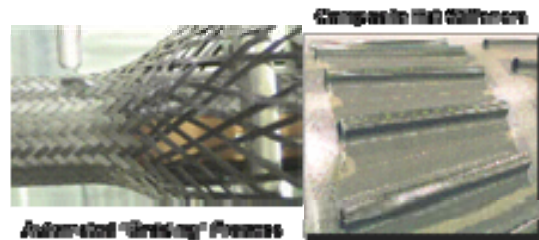
X-Cor™ is a lightweight, damage-tolerant material that is being tested to replace conventional metal or honeycomb in aerospace structures. X-Cor™ reduces weight by an estimated 29 percent and costs by 45-60 percent compared to the baseline aluminum Blackhawk tail cone. Reduced weight improves helicopter performance, particularly in vertical lift/rise capability, which greatly increases aircraft survivability and capacity. X-Cor additionally avoids corrosion associated with conventional metal structures. X-Cor™ incorporates a truss network made up of small-diameter composite rods. Testing is being conducted by PEO Army Aviation.

**Superior Surface Treatment Techniques for Adherent Bore Coatings****Sponsor: OPM Lethality, Picatinny, New Jersey****Vendor: Southwest Research Institute, San Antonio, Texas**

An innovative surface treatment and plasma engineering technology was tested in the deposition process of protective coatings for gun bores. This protects the gun barrels against high-temperature wear and erosion, resulting in service life extension and increased performance when using higher energy, high lethality ammo. Another objective is to eliminate hexavalent chromium and other toxic / hazardous chemicals involved in manufacture. Applications include the M1A1 Abrams Tank, Future Combat Systems, Navy Advanced Gun System, etc. Testing continues at the Unit of Action Maneuver Battle Lab, Fort Knox, KY.

**NAVY AND MARINE CORPS****Affordable Net Shape Stiffener Forming Technology for F/A-18E/F****Sponsor: Naval Air Systems Command****Vendor: Foster-Miller, Waltham, Massachusetts**

Net Shape Stiffener Forming makes the Navy F/A-18E/F more affordable by automating the forming process for composite hat stiffeners in the airframe structure, thereby reducing the cost and facilitating transition for skin-stringer type airframe construction. The current high cost of skin-stringer construction often drives engine design of less robust structural solutions, such as sandwich designs. The robust Net Shape Stiffener Forming provides longer-term life cycle, with less maintenance and logistical support costs. Estimated cost



avoidances: RDT&E (\$7.5 million), Production (\$1.1 million). Testing is being conducted by Northrop-Grumman Integrated Systems, Boeing and Foster-Miller under supervision of NAVAIR PMA 265, Pax River, MD.

Composite Twisted Rudder

Sponsor: Naval Sea Systems Command

Vendor: Structural Composites Inc., Melbourne, Florida

This proposal is to evaluate a new design, a “twisted” shape for combatant rudders, to reduce cavitations and erosion problems and improve fuel efficiency. Twisted rudder geometry is difficult to build and maintain using traditional welded steel construction. Composite rudders are expected to resist corrosion, increase survivability, present a hydrodynamically smoother surface, reduce overall ship weight, and reduce acoustic and magnetic signature. Since the current DD(X) design calls for fielding a composite rudder, the testing and fielding of a DDG-51 ship-set for at-sea operational demonstration is expected to mitigate risk for transition. Estimated cost avoidances: Testing is being supervised by Naval Surface Warfare Center, Carderock Division. RDT&E (\$10 million), O&S (\$5 million).



Friction Stir Processing (FSP) for Virginia Class Submarines

Sponsor: PMS 450 Submarine Acquisition Office

**Vendors: General Tool Company, Cincinnati, Ohio
MTS Corporation, Eden Prairie, Minnesota**

Casting defects can affect the structural integrity of propellers through porosity and cracks. Conventional weld repair, a significant part of the manufacturing and repair process, is labor-intensive, with no guarantee that the propeller will be serviceable. FSP improves cast surface quality and strengthens nickel aluminum bronze by altering the microstructure via thermo-mechanical working. FSP allows rapid repair of surface and subsurface casting defects, improves the surface layer mechanical properties, and may substitute for conventional welding. Such substitution saves manufacturing time and cost while increasing strength and quality of the processed area. Testing is being conducted at the Naval Surface Warfare Center, Philadelphia, PA. Estimated cost avoidances: RDT&E (\$8.8 million), O&S (exceeds \$46 million).



High Performance Standard Advanced Dewar Assembly (HP SADA-II)

Sponsor: USMC PM Tanks / MCSC Quantico, VA

Vendor: Raytheon Corporation / McKinney, TX

Traditional thermal sighting systems are meeting new environmental obscuration. The HP SADA-II is expected to provide a 20 percent range improvement over current MBT FEP capabilities for long-range threat detection, combat identification, and engagement of targets under all battlefield conditions. The SADA is the key component of the thermal sighting system applied to night vision, IR search and track, and thermal targeting. These improvements directly translate into greater situational awareness for the tank crew, improved lethality and survivability, and



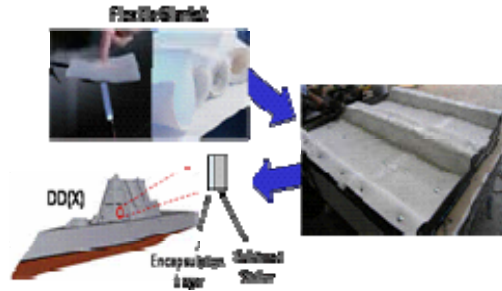
reduction of fratricide and collateral damage. Lab Testing initiated at Raytheon's test bed in McKinney, Texas. M1A1 Testing is scheduled at Aberdeen Test Center, Aberdeen, MD; Yuma Test Center, Yuma, AZ; and at the Marine Corps Air Ground Combat Center, Twenty-Nine Palms, CA. Estimated cost avoidance: RDT&E (\$5.0 million).

Low-Cost Aerogel Insulation for Shipboard Fire and Thermal Protection

Sponsor: Navy PM for Auxiliaries, Recoverability, Materials

Vendor: Aspen Aerogel, Marlborough, Massachusetts

The next-generation ship simultaneously requires top-side weight reduction for increased performance and additional weapons and electronics. Additionally, added safety and survivability specifications call for fire protection on steel and composite structures. An option is parasitic fire barrier / thermal insulation materials, significantly lighter than current fire barrier materials (StuctoGard™ and Dendamix™). A flexible aerogel blanket could yield a 4-fold weight reduction while suppressing IR signature and blast. Initial full scale testing was conducted by Northrop Grumman Ship Systems. Currently the DAC Aspen Aerogel program was placed on hold while Aspen Aerogel initiated an internal development effort to address the combustibility issues of the PYGROGEL material.

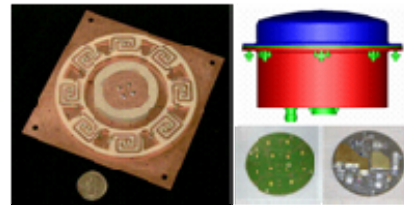


Miniature Controlled Receive Pattern Antenna (MCRPA)

Sponsor: Navy PEO C4I, PMW/PMA-170

Vendor: L-3 Aerospace Electronics Division, Greenbelt, Maryland

Given that some platforms cannot support an increased antenna footprint and installation of an antenna electronics box (e.g., UH-1Y, AH-1Z helicopters and small subs), MCRPA provides a ruggedized antenna and antenna electronics package with a small footprint, light weight, and low cost for Navy and Marine Corps platforms. Design Verification and Engineering Model are being conducted in Baltimore, MD, and at Patuxent River Naval Air Station, MD



Electrical Tests

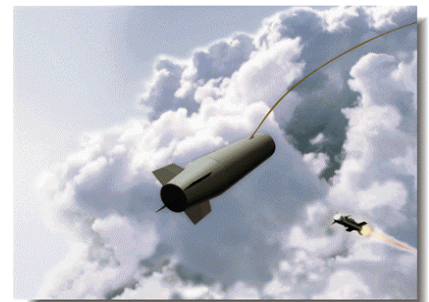
AIR FORCE

Integrated Defensive Countermeasures Alternative

Sponsor: AF Towed Decoy Project Office

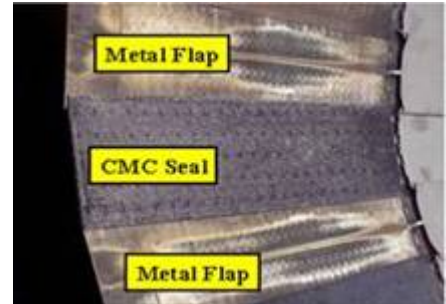
Vendor: Raytheon Space and Airborne Systems, Goleta, California

Fiber optic decoys are towed behind military aircraft to lure hostile radar-guided surface-to-air missiles away from the aircraft. This project will evaluate an alternative Fiber Optic Towed Decoy (FOTD) technology that incorporates towline thermal hardening for increased resistance to heat from engine plume. Towed flight testing will be done to ensure the FOTD deploys throughout required flight envelope and is stable and durable in tow. Integration testing is being conducted at the F-18 facility, Pt. Mugu, CA, with configuration testing on F-15 aircraft at Eglin AFB, FL.



Improved Durability F100 Exhaust Nozzle Divergent Seals**Sponsor: AF, ASC/LPP Wright-Patterson AFB, Ohio****Vendor: Snecma U.S., Walton, Kentucky**

The F100 engine powering both the F-15 and F-16 aircraft has a design life of 4300 total accumulated cycles (TAC) and is scheduled to remain in service beyond 2015. Metal exhaust nozzle divergent seals, a critical engine component, are lasting an average of 600 TACs. These seals degrade as the engines accumulate TACs. Replacement of metallic seals with a ceramic matrix composite (CMC) divergent seal has demonstrated an extension of engine life. This activity completes ground and flight testing to qualify CMC divergent seals as the full-life preferred spares for the F100 nozzle. Testing is being conducted at Mountain Home AFB, Idaho, and McEntire AFB, South Carolina.

**Enhanced Military Readiness, Safety, and Personnel Bearing through Pseudofolliculitis Barbae (PFB) Treatment****Sponsor: AF Surgeon General, Dermatology****Vendor: ISW Group, St. Louis, Missouri**

PFB is an inflammatory / dermatologic skin disease which affects combat readiness, personal safety, unit cohesion, and military morale. Although anyone who shaves can be affected by PFB, it disproportionately impacts those of African descent or Hispanic origin, potentially affecting up to 400,000 active-duty males. PFB ranges from minor skin irritation to severe skin lesions which can act as portals for biological or chemical agents. If left untreated, it can result in infection and scar formation. Effective treatment by a topical agent would improve readiness and safety, avoiding costs associated with shaving clinics, doctor office visits, and other treatments. Testing is being conducted by the AF Surgeon General's Dermatology Consultants and the Brooks AFB, TX, Dermatology Department.

**Qualification of Conformal Fabrics****Sponsor: AF Research Laboratory, Air Vehicles Directorate****Vendor: Pepin Associates, Greenville, Maine**

This project is assessing a weaving process for precursor material with lower cost design. Currently complex composite designs are not widely used in airframes because of high fabrication expense. This new weaving process enables composite material to be formed into complex shapes without significant sacrifice of the high mechanical properties required for aerospace grade structures. Testing is being conducted at Boeing Company, St. Louis, MO.

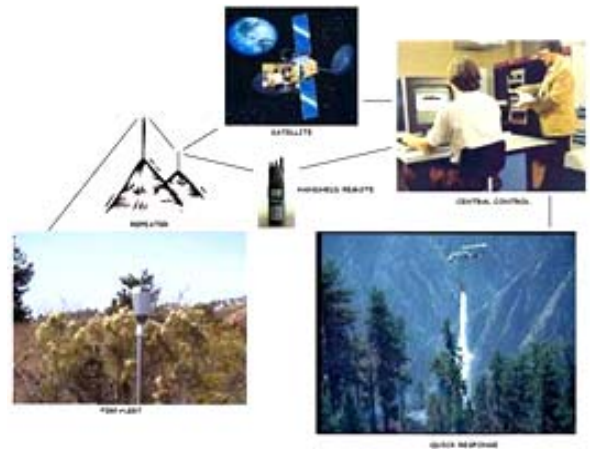


Restore Effective Survival in Shock (RESUS)**Sponsor:** AF 311 HSW, Brooks AFB, Texas**Vendor:** BIOPURE Corporation, Cambridge, Massachusetts

With 90 percent of combat deaths occurring prior to evacuation to a forward surgical theater, decreasing combat morbidity and mortality depends on optimizing pre-evacuation resuscitation. This initiative tests bovine polymerized hemoglobin for the pre-hospital resuscitation of casualties in hemorrhagic shock, which accounts for an estimated 60 percent of salvageable combat casualties. This product, known as “hemopure”, is a low-volume, low-weight, room temperature stable substitute for blood transfusions. It circulates directly in plasma when infused, increasing oxygen diffusion to the body’s tissue, is compatible with all blood types, can be stored for three years without refrigeration, and is pathogen-free. Testing is being conducted by Aeromedical Systems Branch, Brooks AFB, TX and Naval Medical Research Center, MD.

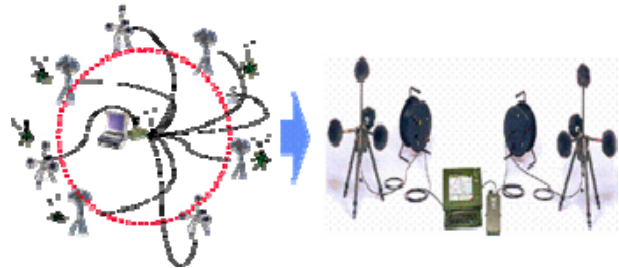
Hemopure**Packed Red Blood Cells****U.S. SPECIAL OPERATIONS COMMAND****Battery-Free Remote Sensing****Sponsor:** SOCOM, PEO Intelligence and Info Systems**Vendor:** Ambient Control Systems, El Cajon, California

This project is testing and evaluating a solar-based energy management system for unattended ground sensors. A smaller, ruggedized package is needed to satisfy SOF requirements for smaller size, lighter weight, and higher output power. The power management system consists of a high-energy photovoltaic solar cell, energy storage, and energy conversion units. Impact is to SOCOM’s Joint Threat Warning System and the Special Operations Tactical Video System. Qualification testing is being done at SOCOM in coordination with Army CECOM and the user field units.



Enhanced Gunfire Detection System (EGDS)**Sponsor:** SOCOM, PEO SOF Warrior**Vendors:** Titan Corporation, Arlington, VA
Matcom Inc., Reston, VA
FLIR Systems, North Billerica, MA
Indigo Systems, Portland, OR
Coherent Logix, Louisville, CO
Wavefront Research Inc., Bethlehem, PA
Northrop Grumman, Troy, MI

The EGDS project is evaluating system enhancements (i.e., addition of sensors and processors) significantly improving the accuracy and capability and with intent to locate a sniper prior to the sniper's first shot. This technology will be implemented through the integration of selected sensors in the baseline GDS and through the inclusion of automatic processing software. The set of additional sensors under evaluation includes laser augmentation devices, hyper-spectral imagers, and unattended ground sensors. Comparative testing is being conducted at Lehnin Military Operations in Urban Terrain Test Facility, Germany.

**Collapsible Buttstock and Ammo Container****Sponsor:** SOCOM, PEO-SOF Warrior**Vendor:** FN Manufacturing, Columbia, South Carolina

The enhanced collapsible stock and ammo container for the MK46 5.56mm and MK48 7.62mm machine guns make the weapons more effective when operating in an urban environment, such as close quarters combat and in vehicles, while safeguarding the ammunition. The adjustable stock provides for ambidextrous use and a sling. One stock design interfaces with both MK46 and MK48, reducing the logistics burden. The same ammunition containers for each weapon will aid in the handling and loading of the weapons. Testing has been conducted by Naval Surface Warfare Center, Crane, IN.

**Infrared-Thermal Friendly Force Identifier****Sponsor:** SOCOM, PEO SOF Warrior**Vendors:** Night Vision Equipment Company, Allentown, Pennsylvania
Wilcox Industries Corporation, Newington, New Hampshire
Falcon Systems Engineering, Crofton, Maryland

Current mechanisms to distinguish dismounted operators as friend or foe are not sufficient to meet evolving battlefield situations. This project tests and evaluates a compact lightweight beacon that enables differentiation when viewed through current IR and thermal sensors. The beacon will be programmable and adjustable for use in multiple situations



and is easily attachable to various types of existing SOF equipment. The system will: 1) increase survivability of the SOF operator; 2) reduce the likelihood of “friendly fire” incidents; 3) be recognizable by U.S. military sighting devices; 4) run on standard-issue batteries and LED light technology for long life and low battery power consumption; and 5) incorporate COTS technology to minimize cost and technical risk. Comparative testing is being conducted at an Army Special Operations R&D Support Element, under supervision from US Army Natick Soldier Center, Natick, Massachusetts.

Nickel Boron Coating of Diesel Engine and Drive**Sponsor: SOCOM, PEO – Naval Systems****Vendors: Engine Tech, Ocala, Florida****Universal Chemical Technologies, Stuart, Florida**

This project is evaluating a process for Nickel Boron Coating to extend the service life of diesel engines and drive assembly. Coating the propulsion system components with Nickel Boron is an effective way to increase the power to weight ratio and extend the propulsion systems lifecycle. This process promises to improve engine performance by 8-10%, increase maintenance intervals by 150% and service life by 125%, and save over \$3 million in RDT&E cost avoidance. Qualification testing conducted by Naval Surface Warfare Center, Dahlgren, VA, under direction of the Naval Sea Systems Command, Washington, D.C.

**Miniature Day / Night Sight (MDNS) Integration****Sponsor: SOCOM PEO – SOF Warrior****Vendors: EoTech, Ann Arbor, Michigan; Trijicon, Wixom, Michigan;****Raytheon, Richardson, Texas;****Northrop Grumman Litton EOS, Garland, Texas, and Tempe, Arizona;****Insight Technologies, Londonderry, New Hampshire**

This project is evaluating the improvement, miniaturization, ruggedization and integration of numerous existing and improved components/subsystems. It promises to enhance SOF weapons capabilities for carbines, rifles and machine guns. It comprises components and sub-systems from several vendors for various missions, including fire control, target acquisition, and aiming (e.g., thermal and image-intensified clip-on night vision devices, a second-generation backup iron sight and rail interface system, and enhanced combat optical sight for close quarter battle). The project objective is to improve and combine these capabilities into one fully integrated modular system with compatible standardized interfaces for SOF weapons. Comparative testing is being performed at Naval Surface Warfare Center, Crane, IN.



Precision Parachute Delivery System (PPDS)**Sponsor: SOCOM, PEO-SOF Warrior****Vendor: Prescott Products, San Antonio, Texas**

SOF parachutists have little ability to navigate to a target unless the target is seen when exiting the aircraft. PPDS is a high altitude-low opening / high altitude-high opening helmet system that includes a heads-up display navigation aid and integrated oxygen system. The system guides the parachutist during the descent to a precise touchdown point, minimizing detection among a wide range of environmental conditions. This technology promises to provide the capability and the confidence to accomplish the aerial deployment phase of an SOF mission safely and accurately, while minimizing detection. Qualification testing is being conducted by Airdrop/Aerial Delivery Directorate, Natick Soldier Center, Natick, MA.



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PROJECTS INITIATED IN FY 2006

Twenty-two DAC projects were initiated in FY 2006. The projects listed in Table 4 were approved in September 2005 to be funded as new starts at the beginning of the fiscal year.

Table 3. PROJECTS SELECTED FOR FY 2006 FUNDING

Service / Agency	Project Title
Army (5 Projects)	<ul style="list-style-type: none"> • External Aircraft Rescue Hoist for the Army Black Hawk Helicopter • Modular Land Warrior Fuel Cell Power System • Ruggedized Radio Frequency Identification Tags with Highly Flexible Antenna • Super-Capacitor Power Source for Gun Launched Munitions • Topical Paromomycin for the Treatment of Cutaneous Leishmaniasis
Navy / Marine Corps (6 Projects)	<ul style="list-style-type: none"> • 7.62mm & 9mm Reduced Environmental Hazard Ammunition • Digital head Up Display for F/A-18 Aircraft • Mine Neutralization by Explosive Ordnance Disposal Teams in Very Shallow Water • Tactical Remote Sensor Systems Monitoring Station Modernization • Titanium Encapsulated Silicon Carbide Skirt Armor for Expeditionary Fighting Vehicle • Trailer Mounted Generator/Environmental Control Unit
Air Force (5 Projects)	<ul style="list-style-type: none"> • Communications and Networking for a Deployable Internet • Extended 1553 Databus Graceful Degradation • Improved Infrared Missile Self-Protection System for the F-15 Aircraft • Nickel Nanostrand Coating for Improved Lightning Strike Protection • Project Angel Fire
Special Operations Command (6 Projects)	<ul style="list-style-type: none"> • Compact Broadband Remote Antenna Intelligence and Information Systems Enhancements • Covert Eyes 3-Dimensional Video Camera • Electronic Intelligence Receiver • Green Light Aiming Laser for Special Operational Forces Small Arms • Portable Tactical Wireless Broadband Network • Specific Emitter Identification Insertion Vehicle

ARMY**External Aircraft Rescue Hoist for the Army Black Hawk Helicopter****Sponsor: Army Utility Helicopter Project Office****Vendor: Goodrich Corp., Diamond Bar, CA, and Breeze-Eastern, Union, NJ**

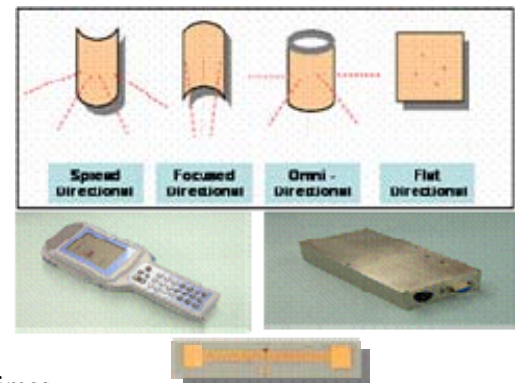
The goal is to upgrade the HH-60M medical evacuation helicopter with a hoist system that offers superior operational performance, higher reliability, and lower total life cycle-cost over the hoist currently considered. This project will install and test an improved external aircraft rescue hoist with state-of-the-art motors with improved braking capabilities. A comparative qualification test will be conducted with a single hoist down-selected for operational testing and subsequent airworthiness release assessment and HH-60M fielding. Testing is being conducted by the Army Aviation Technical Test Center, Ft. Rucker, Alabama. Estimated cost avoidances: Procurement (\$10 million) and life-cycle Operations and Support (O&S) is \$60 million.

**Modular Land Warrior Fuel Cell Power System****Sponsor: Army PM Soldier Warrior****Vendor: DuPont, Wilmington, DE**

This DAC project will test a small, advanced, high-power, light-weight, wearable power source (a direct methanol fuel cell power system) for military operations. The device will have embedded circuitry enabling recharge of batteries during wear. Applications include Soldier-carried electronic systems in radios, navigation systems, hand-held battlefield command and control systems and weapon sensors. Additional benefits include reduction of the Soldier's weight load, longer mission duration and improved Soldier lethality. Testing is by Army Communications Electronics Research, Development and Engineering Center, Ft. Monmouth, New Jersey. Estimated cost avoidances: RDT&E (\$45 million) and O&S (\$193 million).

**Fuel Cell Power System Connected to Land Warrior Battery****Ruggedized Radio Frequency Identification (RFID) Tags with Highly Flexible Antenna****Sponsor: PEO Soldier – PM Soldier Warrior****Vendor: Vivid Systems, Canton, MS**

RFID tags with read/write capabilities that are designed for harsh environments and flexible enough to be used on both textiles and metals are to be tested for military use. These tags and their associated reader / writer will be tested and evaluated on the Army M4 modular weapon, AN/PRC-148 Multi-Band Inter/Intra Team Radio, and other Soldier equipment items. These tags are ruggedized data carriers with the capability of rapid reading over long distances and can be exposed to temperature and weather extremes. One type of tag to be tested has a memory lifespan of 10 years and can be rewritten 100,000 times. Testing will be conducted by the Army New Equipment Training Facility, Haymarket, VA. Estimated cost avoidances: RDT&E (\$22 million), O&S (\$10 million per year).



Super-Capacitor Power Source for Gun-Launched Munitions**Sponsor:** Army ARDEC (PM for Excalibur) Picatinny Arsenal**Vendor:** Raytheon, Tucson, AZ, and Maxwell Technologies, San Diego, CA

When artillery fire is cancelled, non-fired shells whose electronics assembly was energized during the loading process lose operational capability owing to battery life limitation. For example, an Excalibur projectile must be fired within fifteen days after initialization with GPS and target location data or returned to depot for re-work. This DAC initiative tests a super-capacitor power source (effectively a hybrid between a battery and a capacitor) to increase gun-launched artillery survival by leveraging COTS super capacitors used today in laptop computers and cell phones. This could provide the warfighter with an operationally versatile artillery projectile at significant cost avoidance as well as speed technology transition into other munitions. Added benefits include increased reliability, parts count reduction, and elimination of the pyrotechnic primer required to activate the current reserve cell battery. Testing is at the Army Field Artillery Command, Ft. Sill, Oklahoma. Estimated cost avoidances: RDT&E (\$1.4 million), O&S (\$1.1 million), and procurement (\$5.4 million).

**Topical Paromomycin for the Treatment of Cutaneous Leishmaniasis (CL)****Sponsor:** Army Medical Materiel Development Activity**Vendor:** TEVA Pharmaceuticals North America, North Wales, PA

This initiative tests Topical Paromomycin, a new drug to treat CL, a serious disfiguring and parasitic disease that has affected over 1,000 of our deployed troops. CL typically presents as ulcerous skin lesions that develop over weeks to months after a person is bitten by an infected sand fly. The current treatment requires daily injections (over 10-20 days) of a drug that has serious side effects and must be strictly administered under medical surveillance. This requires infected soldiers to be evacuated out of theater either to Walter Reed or Brook Army Medical Center. The average cost per patient for is \$17,000 for hospitalization and treatment, with approximately 60 lost duty days. Topical Paromomycin treats infected soldiers on station, allowing them to heal while remaining at their posts. Testing will be conducted by Army Medical Research and Materiel Command.

**NAVY / MARINE CORPS****7.62mm and 9mm Reduced Environmental Hazard Ammunition (REHA)****Sponsor:** USMC PM AMMO, MCB Quantico, VA**Vendor:** Alliant Tech, Toone, TN;

Kilgore, Marion, IL;

Winchester, Independence, MO;

Remington, Lonoke, AR;

Elk River Corp., Knoxville, TN

Precision Ammunition, Tampa, FL



In FY05, Marines fired more than 15 million lead rounds at U.S. outdoor training ranges. These ranges incur exorbitant costs remedying this lead contamination. Objective is to reduce range clean-up costs and reduce lifecycle cost of the 7.62mm and 9mm cartridges by testing REHA rounds produced with environmentally safe components that meet or exceed current ballistic

performance. REHA cartridges are expected to be commensurately priced with lead cartridges pending achievement of comparable production rates. This provides the warfighter with a lead-free training and combat cartridge that will alleviate the high costs of range clean-up. Testing is being conducted by the USMC Operational Test and Evaluation Activity and NSWC Crane, Indiana. Estimated cost avoidances: RDT&E (\$8.8 million), O&S (exceeds \$46 million).

Digital Heads-Up Display (DHUD) for F/A-18 Aircraft

Sponsor: Naval Air Systems Command

Vendor: Rockwell Collins/ Boeing Company, San Jose, CA

The current Heads-Up Display (HUD) in the F/A-18 is a critical flight instrument, but one of the most unreliable components in the aircraft. When the HUD is inoperative, the aircraft is NOT MISSION CAPABLE. A reliance on obsolete Cathode Ray Tube (CRT) and other analog technologies makes the HUD a logistics nightmare to troubleshoot, from flight line to depot-level repair facilities. CRTs and other analog components of the system also suffer from a diminishing vendor base, driving repair costs higher at all levels. Rockwell Collins is supplying an all-Digital HUD (DHUD) to commercial airlines, business/regional jets and military transports--one that does not rely on CRTs, high-voltage electronics, or high-power analog circuitry. The DHUD will replace the CRT with a Liquid Crystal on Silicon projection engine, backlit by a solid state high-intensity lamp system. High power components will be removed from the HUD, enhancing reliability of the system. Estimated cost avoidances: RDT&E (\$10.6 million), O&S (exceeds \$200 million over 10 years).



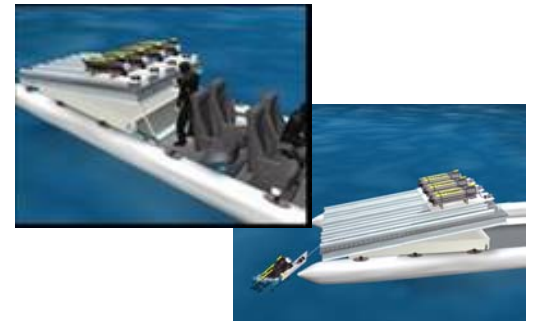
Mine Neutralization by EOD Teams in Very Shallow Water (VSW)

Sponsor: Navy Program Executive Office - Littoral Mine Warfare and Program

Management Ship – Explosive Ordnance Disposal, Indian Head, MD

Vendor: EDO Corporation, N. Amityville, NY

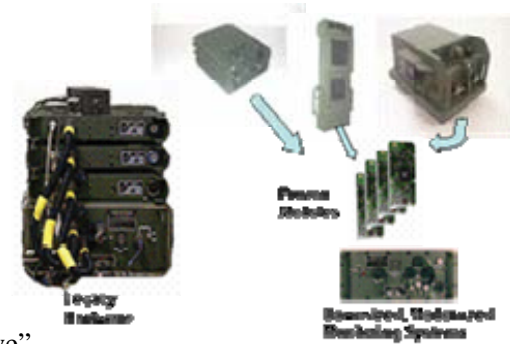
This technology provides an evolutionary approach for an effective, efficient, low-risk method for providing mine neutralization, initially from a manned surface and spiraling to an Unmanned Surface Vehicle (USV). The planned USV will be a Rigid Hull Inflatable Boat (RHIB) currently used by Navy Special Clearance Team One (NSCT-1), with a developed and proven fleet mine neutralizer system for the relocation, identification and disposal of sea mines and other ordnance found at sea. The Unmanned Mine Neutralization System has the added advantage of taking the diver out of the loop via remote control of the RHIB. An autonomous underwater vehicle mission will save valuable resources in shallow water mine neutralization. Testing will be conducted by the Naval Surface Warfare Center (Panama City and Indian Head), with NSCT-1 and Commander, Operational Test and Evaluation Force participation. Estimated cost avoidances: RDT&E (\$6 million), manufacturing (\$3 million), procurement (\$3 million) and O&S (\$600 thousand).



Tactical Remote Sensor Systems (TRSS) Monitoring Station Modernization**Sponsor: MARCORSYSCOM PM Intel Systems****Vendor: Nova Engineering, Cincinnati, OH**

TRSS is composed of a number of unique pieces of communications equipment, predominantly receivers, transmitters, and antenna switches. The physical attributes of the legacy hardware make “mobile” sensor monitoring a practical impossibility from the number of configuration items and their associated sizes, weights, and power requirements. This testing of smaller hardware configuration will adapt USMC sensor monitoring system to lighter, more mobile platforms that can be deployed and operated “on the move”.

Additionally, the supportability of the legacy systems is at risk due to out-of-production parts; the small lot sizes can only be fabricated in special builds at high unit costs. The user evaluation will be conducted in Twentynine Palms, CA. Estimated cost avoidances: RDT&E (\$15 million) and O&S / lifecycle (\$98 million).

**Titanium Encapsulated Silicon Carbide Skirt Armor for EFV****Sponsor: DRPM, AAV (EFV PM, Woodbridge, VA)****Vendor: General Dynamics, Woodbridge, VA, and Cercom Inc., Vista, CA**

Both to satisfy weight requirements and protect the vehicle and crew, lightweight composite skirt armor is used to shield the lower half of the EFV vehicle the lightweight skirt armor system. Large composite tiles adhered to aluminum substrates form the current armor and delaminates through salt water corrosion, reducing system durability and armor capability. This project tests a titanium-encapsulated skirt armor, composed of small silicon carbide armor tiles linked together in a net shape and encapsulated with several layers of titanium. This design will allow the skirt armor to sustain multiple hits in the same area while maintaining protection, offering significant weight reduction (5 percent system reduction), and preventing corrosion from salt water. Testing will be conducted by the Army Research Lab, Ft. Belvoir, Virginia, and the Live Fire Testing at Aberdeen Proving Grounds, Maryland. Estimated cost avoidances are: RDT&E (\$2.5 million), manufacturing (\$14.2 million), and O&S (\$42 million).

**Trailer Mounted Generator/Environmental Control Unit (TMG/ECU)****Sponsor: PM Expeditionary Power Systems / MCSC Quantico, VA****Vendor: General Dynamics C4 Systems / Scottsdale, AZ**

The TMG/ECU integrates a single trailer platform capable of powering and cooling all expeditionary command and control systems, while replacing currently fielded equipment over 400% larger in transport weight, logistics footprint, and operating manpower requirement. The TMG/ECU is driven by Marine Corps requirement for an off-road, ruggedized, HMMWV towable trailer system: 20-40 kW of electric power and 100,000 British Thermal Unit (BTU) of cooling or heating for the Marine Expeditionary Forces (MEF). This system represents a quantum leap in mobility to forward-deployed forces for both timely power generation and environmental control within Command Operations Centers. The candidate



systems initially performed Technical Testing at Aberdeen Test Center (ATC) in Aberdeen, Maryland. The program office down-selected to the best performing candidate technology, General Dynamics C4 systems, and will qualify the system through External Air Transportability Testing by NAVAIR at ATC and User Evaluations by the Marine Corps Operational Test & Evaluation Activity at Quantico, VA. Successful completion of this project means the USMC avoids RDT&E costs of over \$4.0M.

AIR FORCE

Communications and Networking for a Deployable Internet

Sponsor: AF Research Laboratory, AFC2ISRC/SCY

Vendor: Northrop Grumman, Melbourne, FL

Interim Capability for Airborne Networking (ICAN) will allow legacy voice communication networks on operational aircraft to transmit, receive, or pass internet protocol message traffic, such as text messages and imagery, between airframe platforms and ground based personnel. This project updates and migrates ICAN software into the DoD standard Joint Tactical Radio System (JTRS) software communications architecture and provides JTRS-compliant message traffic four years ahead of the current schedule. The Joint Surveillance Target Attack Radar System Special Projects Office and Air Force Test and Evaluation Center (Detachment 1) will perform test flights. Projected cost avoidances: RDT&E (\$8.3 million) and O&S (\$10-20 million).

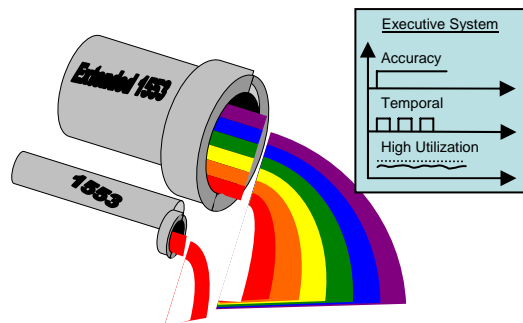


Extended 1553 Databus-Graceful Degradation

Sponsor: Agile Combat Systems Support Wing, WPAFB, OH

Vendor: Dayton Aerospace, Inc., Dayton, OH

This innovative scheduling and control system for planned Extended 1553 data bus weapons platforms can assure accurate, efficient, and reliable operations under degraded conditions. This technology supports the Air Force upgrade of Mil-Std-1553B local area network. It provides hundreds of times greater performance by adding the increased capability and functionality for future operational capability aircraft upgrades (e.g., net-centric warfare), while avoiding major aircraft re-design and retrofit costs (insertion of fiber-optics). This could significantly reduce future software development and support costs by minimizing the time aircraft must be taken out of service for upgrades. Testing is being done by Dayton Aerospace and Edgewater Computer Systems Inc of Canada under the supervision of the B-2 systems group WPAFB OH. Estimated cost avoidances: RDT&E (\$15 million), and procurement (\$1.6 million per aircraft).

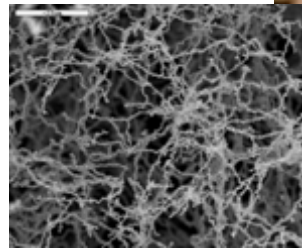


Improved IR Missile Self-Protection System for the F-15 Aircraft**Sponsor:** AF, ASC/VF, WPAFB, OH**Vendor:** BAE North America, Austin, TX, and Boeing Company, St Louis, MO

This technology supports F-15 aircraft with an improved self-protection countermeasure dispenser (CMD) against air-to-air and surface-to-air missiles. The current CMD is operational on the Air National Guard F-15A/B. The dispenser and missile launcher improvements undergoing testing will provide hardware and software interfaces to increase aircrew situational awareness, enhance self protection, and reduce pilot workload. Testing is at the Boeing System Integration Lab, St. Louis, MO. Estimated cost avoidance is \$3.6 million (procurement).

**Nickel Nanostrand Coating for Improved Lightning Strike Protection****Sponsor:** AF Research Laboratory, MLBP/MLBCO, WPAFB, OH**Vendor:** Metal Matrix Composites, Midway, UT

This project will test treating the surface of a composite with these conductive paints to determine if lightning strike and its resulting damage are kept at or near the surface of the aircraft, damaging the paint but not the composite. Nickel nanostrand materials create greater conductivity in paints, coatings, and composites and replace the heavy metal mesh materials in applications to date. Advantages include lower installation costs, reduced weight, and allowance for greater payloads, easier and quicker repair, and increased mission safety. Testing will be at a combination of Boeing and Air Force facilities. Estimated cost avoidances: RDT&E (\$4-10 million), manufacturing (\$10-20 million), and procurement (\$35 million).

**Project Angel Fire – Situational Awareness of Large-Area Urban Operations****Sponsor:** AF**Vendor:** BAE North America, Austin, TX, and Boeing Company, St. Louis, MO

Angel Fire (AF) is a tactical situational awareness system that provides real-time, high-resolution (.5m), city-sized images (66 mega pixels) of infrastructure, vehicles and people to hundreds of users. This expansive coverage enhances tactical support, forensic analysis, and predictive analysis and in turn directly supports urban combat, base defense, border security, improvised explosive device detection and other anti-insurgency/counter terrorist efforts. This project is being tested at 29 Palms, CA, NSWC China Lake, CA and Los Alamos National Laboratory, NV. Estimated RDT&E cost avoidance is \$10 million, with a procurement potential of 15 systems with a nominal value of \$85 million.



U.S. SPECIAL OPERATIONS COMMAND**Compact Broadband Remote Antenna (CoBRA) Intelligence and Information Systems Enhancements****Sponsor: SOCOM PEO Intelligence and Information Systems****Vendor: SWE-DISH Satellite Systems Inc., Reston, VA**

These are portable satellite communications enhancements that provide SOF and other military users with an improved, more robust communications capability, lowering CoBRA's operational cost. This technology allows for multiple satellites with higher data transmission rates, reduces SOF dependence on commercial satellites for secure transmissions, and provides military users with increased flexibility and greater efficiency in completing their missions. Estimated cost avoidances: RDT&E and manufacturing (\$10 million), procurement (\$2.5 million) and O&S \$1 million).

**Covert Eyes 3-Dimensional (3-D) Video Camera****Sponsor: Special Operations Tactical Video System (SOTVS), PM Reconnaissance and Surveillance, PEO-Intelligence and Information Systems****Vendor: Geo-Spatial Technologies, Inc., Lorton, VA****Advanced Scientific Concepts, Inc., Santa Barbara, CA.**

This project is a multi-purpose, high-resolution, 3-D Flash Laser System. It enables SOF to acquire and view targets through vegetation, window blinds, smoke, and tinted windows, during either daylight or total darkness. This system serves as both a camera and camcorder, supporting standoff ranges of up to 250 meters. It will allow the viewer to rotate, pan, zoom and examine a subject from any viewing angle, in real-time. Projected cost avoidances: RDT&E (\$10 million) and O&S (\$2.8 million).

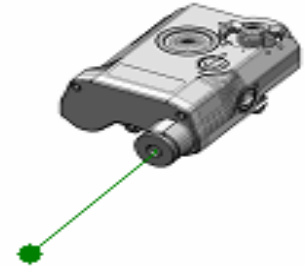
**Electronic Intelligence (ELINT) Receiver****Sponsor: SOCOM Program Manager for Intelligence (PEO IIS-PMI)****Vendor: Mid-Atlantic RF Systems, Forest Hill, MD**

This proposal tests and evaluates a threat warning receiver that detects threat radar signals emitted from enemy missiles, maritime craft, helicopters and surveillance aircraft. The data derived from this receiver, known as ELINT, provides a substantial detection capability not currently available to the SOF. Because of its small size and weight, the receiver will fit into existing SOF vests and can be used in either stand-alone or as an integrated component of the SOF Joint Threat Warning System. Initial review of the technical specifications for ELINT indicates that it has substantially increased sensitivity to detect these threatening signals within the radar spectrum. Testing will be conducted by SOCOM and the Navy Space and Warfare Systems Center Charleston, SC personnel. Estimated cost avoidances: RDT&E (\$5 million), manufacturing (\$2 million), procurement (\$5 million), and O&S (\$1 million).



Green Light Aiming Laser for SOF Small Arms**Sponsor: SOCOM PEO SOF Warrior****Vendor: Insight Technology, Londberry, NH; Aimpoint, Alpharetta, GA
B.E. Meyers and Company, Redman, WA**

A green light laser aiming device is proposed as a superior replacement to the existing red light laser aiming device for small arms/weapons in Special Operations Forces. Green light lasers are closer to the center of the spectrum of human vision; they provide much better contrast than red lasers when used against green and black objects and provide superior visibility in bright sunlight on green and black targets. These lasers have the potential for up to 200 meters longer distance in range operation than current red light lasers. Testing will be conducted at NSWC Crane, Indiana. Estimated cost avoidances: RDT&E (\$4 million), manufacturing (\$4 million), and procurement / O&S (\$2.5 million).

**Portable Tactical Wireless Broadband Network****Sponsor: SOCOM PEO Intelligence and Information Systems****Vendor: Rajant Corporation, Wayne, PA**

This project will test an individual wireless radio that provides a self-forming, self-healing, meshed, secure wireless broadband network for improved SOF communication on the battlefield using BreadCrumb® technology. Capabilities for evaluation involve SOF operations underground, in tunnels, in mountainous areas and within buildings.

**Specific Emitter Identification Insertion Vehicle****Sponsor: SOCOM PEO Rotary Wing Aviation****Vendor: ITT Industries (Avionics), Clifton, NJ**

The objective is the simultaneous integration of the digital Specific Emitter Identification (SEI) into the ALQ-211. The ALQ-211 Suite of Integrated Radio Frequency Countermeasures (SIRFC) program is developing an analog receiver with plans for a FY 2007-2008 upgrade to digital, necessary to integrate the SEI into the SIRFC receiver. Automating the SEI within the ALQ-211 SIRFC System improves system threat identification performance and reduces the recurring SIRFC ship-set cost. This leads to more effective jamming, improving aircraft self-protection and enhancing aircrew survivability and mission success. Testing will be at Tactical Applications Program Office, Ft. Eustis, VA. Projected cost avoidances are: RDT&E (\$5 million), production (\$38.5 million), and procurement (\$19.5 million).



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PROJECTS SELECTED FOR FY 2007

Eighteen DAC projects were selected for FY 2007. The projects listed in Table 4 were approved in October 2006 to be funded as new starts at the beginning of the fiscal year.

Table 4. PROJECTS SELECTED FOR FY 2007 FUNDING

Service / Agency	Project Title
Army (5 Projects)	<ul style="list-style-type: none">• 10kW Tactical Vehicle Inverter System• Fiber Optic Gyro Based Rate Sensors for Combat Vehicles• Improved Performance HH-60M Environmental Control System• Low-Cost Land Warrior Cable Connector System• Personal Oxygen Generator
Navy / Marine Corps (5 Projects)	<ul style="list-style-type: none">• AN/BSN -2 Digital Depth Detector• Combat Rubber Raiding Craft• Improved Loader's Weapon Station for USMC M1A1• Non-Gasoline Burning Outboard Engine• Rucksack Portable Receive Suite
Air Force (4 Projects)	<ul style="list-style-type: none">• Angel Fire Spiral - Situational Awareness of Large-Area Urban Operations• C2 Resource Management: Master Caution Panel• Cost Effective Light Aircraft Missile Protection• Low Plasticity Burnishing to F100 Engine Airfoils
Special Operations Command (4 Projects)	<ul style="list-style-type: none">• Crew Served and Heavy Weapons Aiming Laser• Improvements to Suite of Integrated Radio Frequency Countermeasures Systems• Lithium Ion Battery System for the MK8 MOD1 SEAL Delivery Vehicle• Modular Advanced Composite Armor Kits for SUVs

ARMY

10kW Tactical Vehicle Inverter System (TVIS)

Sponsor: Army PM-TOC, USMC PM-TMDE MARCORSYSCOM

Vendors: Avionics Instruments, NJ; Pivotal Power, MO; ITT Power Systems, MA

Power systems currently available in the military inventory are Tactical Quiet Generators and Auxiliary Power Units, which require periodic maintenance, refueling, and transporting. The TVIS is a smaller, lighter power system that can be rack mounted inside a vehicle mounted shelter. This inverter provides clean, regulated AC power that adds mission system protection and reliable operation. One of the critical benefits is reduction of weight to light tactical vehicles (approximately 455 lb reduction in weight). This is especially important given that vehicle weights have increased with the addition of Up-Armor kits. Estimated cost avoidances: RDT&E (\$2 million), procurement cost avoidance (\$1.04 annually) and O&S (\$10.7 million annually).

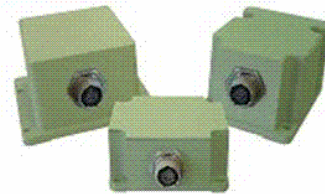


Fiber Optic Gyro Based Rate Sensor for Combat Vehicles

Sponsor: Army PEO-GCS, USMC PM for LAV

Vendors: Curtiss Wright, Santa Clarita, CA; BAE Systems, Santa Clara, CA; L3 Com, Muskegon, MI

Fiber Optic Gyro instruments developed and qualified for the United States Marine Corps Expeditionary Fighting Vehicle can replace mechanical gyros to offer significant improvements in reliability, performance, and cost reduction. This project is to extend the technology into the Bradley Fighting Vehicle, M1 Tank Systems and the Marine Corps LAV-25 platform. Estimated cost avoidances: RDT&E (\$1.3 million), O&S (\$41.75 million) and fielding reduction of 3+ years.

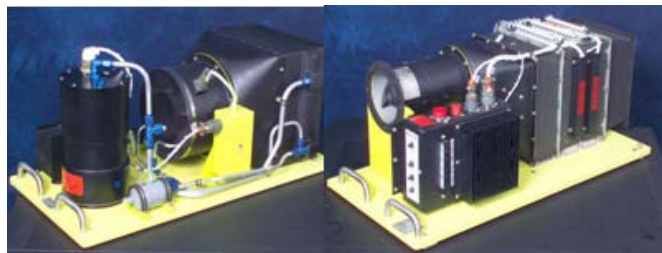


Improved Performance HH-60M Environmental Control System

Sponsor: PM Utility Helicopters

Vendor: Enviro Systems Inc., Seminole, OK

This improved system will provide 25% more cooling capacity to treat the patient in a cooler environment when the aircraft is operating in a hot climate. The addition of the fan speed control will maintain the aircraft cabin temperature at a constant temperature by increasing or decreasing the amount of cold or hot air supplied to the aircraft cabin. Better environmental control improves the care of the injured soldiers and increases the survivability of the critically injured warfighters. Estimated cost



PROJECTS SELECTED FOR FY2007

Defense Acquisition Challenge Program FY 2006

avoidances: RDT&E (\$2.5 million), O&S (\$15.7 million) and procurement cost avoidance of (\$4.3 million).

Low Cost Land Warrior Cable Connector System

Sponsor: Army PEO Soldier, PM Soldier Warrior

Vendor: American Competitiveness Institute, Philadelphia, PA

The Land Warrior System is designed to limit fratricide by providing enhanced situational awareness to the warfighter while adding lethality and force protection. When this improvement of injection molded connector shells is implemented, cost for each Land Warrior system will decrease significantly, as will the incidence of fratricide. The injection molding method also is more quickly produced and therefore more quickly deployed. Titanium connectors are 40% lighter than current connectors manufactured from stainless steel, and they avoid wear from mating and de-mating. Estimated cost avoidances: RDT&E (\$5 million), initial procurement cost (\$1.633 million) and fielding reduction of 5+ years.



Personal Oxygen Generator

Sponsor: Army Medical Materials Development Activity

Vendor: Sequal Technologies, San Diego, CA; IGR Enterprises, Cleveland, OH

This project would develop an oxygen concentrator that could travel with the patient and operate on internal batteries or external power, never needing refill. This product is intended to replace the refillable steel cylinders currently held by field hospitals and aid stations. These cylinders are shipped initially from the U.S. and then either refilled from local oxygen sources or returned to the U.S. for refilling. The current technology is very heavy and expensive; in addition, stored compressed oxygen cylinders are a hazard in use and transport. Oxygen cylinders can explode or enrich fires; an oxygen concentrator would simply stop making oxygen. Estimated cost avoidances: procurement cost savings (\$25 million annually), O&S (\$27 million) with a procure potential of 4,000 units

NAVY / MARINE CORPS

AN/BSN-2 Digital Depth Detector

Sponsor: Naval Sea Systems Command, PEO IWS6

Vendor: SPAWARSYSCEN, Charleston, SC

The AN/BSN-2 Digital Depth Detector (DDD) was developed as a form, fit, and functional replacement for the current antiquated (1950s) depth detector installed on SSN/SSBN submarine platforms. The DDD is a state-of-the-art microprocessor-based system with readily available Commercial Off-the-Shelf components. The DDD is more reliable and maintainable, reduces system life cycle costs by 87%, and provides additional functional/operational capabilities necessary to support the objectives of the Navy's Submarine Modernization Program. In-service testing will be conducted at sea by SPAWARSYSCEN, Charleston, SC. Estimated cost avoidances: RDT&E (\$1.5 million) and O&S (\$1.5 million).



Combat Rubber Raiding Craft**Sponsor: USMC PM Raids & RECON, Quantico, VA****Vendor: Zodiac of North America, Stevensville, MD**

This project tests improved deployment and transportability of the Combat Rubber Reconnaissance Craft (CRRRC). The USMC will test the F-470 Evolution 7, manufactured by Zodiac of North America to maximize the Marine Recon Mission Profile. The CRRRC Product Improvement Program features a self-inflation system and an inflatable rigid floor that reduces system weight by 17% and set-up time (by a single warfighter) by 87%, significant improvements for operational capability and force protection. Testing will be conducted at several locations, including Raids & RECON test facility at Quantico, VA. Estimated cost avoidance: RDT&E (\$6.0 million) with procurement avoidance of \$.350 million. The transition plan is to immediately field to 3rd Recon Battalion and 1st Forces Recon Company in Iraq and 2nd Recon Battalion for combat operations.

**USMC M1A1 Improved Loader's Weapon Station****Sponsor: MARCORSYSCOM, Armor Fire Support Systems, PM Tanks, Quantico, VA****Vendor: Recon Optical Inc., Barrington, IL; EFW, Ft. Worth, TX**

The USMC has an operational requirement to increase the survivability and lethality of the M1A1 Main Battle Tank. Situational reports from OIF have identified loaders as particularly prone to enemy fire from their high-seated position in the loader's weapon station in the M1A1. The USMC will test integration of these non-developmental items to an Improved Loader's Weapon Station (ILWS). The loader's exposed profile decreases by 50% and also enables rapid change in the direction of fire, while providing a more stable firing platform for up to 25% increased downrange firing accuracy. Testing will be conducted by the Naval Surface Warfare Center (Panama City and Indian Head), with NSCT-1 and Commander, Operational Test and Evaluation Force participation. Estimated cost avoidances: RDT&E (\$1.1 million), procurement (\$.5 million) and fielding reduction of two years. The USMC transition plan is to field immediately to Iraq for integration onto M1A1's.

**Non-Gasoline Burning Outboard Engine****Sponsor: MARCORSYSCOM PM Raids & RECON****Vendor: Bombardier Recreational Products, Waukegan, IL**

The USMC will test to replace the current Small Craft Propulsion System with a Non-Gasoline Burning Outboard Engine (NBOE). Testing will be for compliance with DoD policy for fuel standardization to kerosene-based and diesel fuels. The NBOE will increase safety through reduced need for gasoline and will allow continued use of the Combat Rubber Reconnaissance Craft, maintaining the USMC's primary amphibious capability for Over-The-Horizon reconnaissance operations. The user evaluation will be conducted at Quantico, VA. Estimated cost avoidances: RDT&E (\$3 million) and O&S / lifecycle (\$.09 million).



Rucksack Portable Receiver Suite**Sponsor: U.S. Navy SPAWAR Systems Center Charleston****Vendor: Windmill International, Nashua, NH**

SPAWAR will test the Rucksack Portable Receive Suite (RPRS), an extremely lightweight, ruggedized one-man-portable Global Broadcast Service (GBS). The RPRS will enable the warfighter to set up and receive the GBS satellite broadcast anywhere, allowing reception of a full array of on-the-spot, actionable intelligence information, including live Predator video, full resolution satellite imagery, and up-to-date rebroadcast information products rebroadcast. Estimated cost avoidances are: RDT&E (\$1.6 million), manufacturing (\$3 million), and O&S (\$2.9 million).

**AIR FORCE****Angel Fire Spiral – Situational Awareness of Large-Area Urban Operations****Sponsor: AF****Vendor: BAE North America, Austin, TX, and Boeing Company, St. Louis, MO**

Angel Fire (AF) is a tactical situational awareness system that provides real-time, high-resolution (.5m), city-sized images (66 mega pixels) of infrastructure, vehicles and people to hundreds of users. This expansive coverage enhances tactical support, forensic analysis, and predictive analysis that in turn directly support urban combat, base defense, border security, improvised explosive device detection and other anti-insurgency/counter terrorist efforts. Following a successful demonstration of the basic AF capability at the Marine Corps Air/Ground Combat Center in May/June 06, USMC specifically requested three further refinements that would “customize” AF for deployment/employment in OIF: a high-resolution spot-beam capability; a night, infrared, wide-area surveillance capability; and a comprehensive plan to transition to a full acquisition program. This project is being tested at 29 Palms, CA, NSWC China Lake, CA and Los Alamos National Laboratory, NV. Estimated RDT&E cost avoidance is \$10 million, with a procurement potential of 15 systems with a nominal value of \$85 million.



C2 Resources Management: Master Caution Panel**Sponsor: AF Research Laboratory, AFC2ISRC****Vendor: SRA International, Dayton, OH**

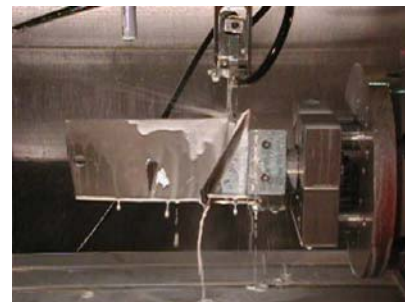
This technology allows network/system administration personnel to monitor the internal network of a C2 enterprise, such as an Air Operations Center, providing status of machine availability, connectivity, software processes, and host health. It bridges the gap between the warfighter environment and the system administrators and engineers, maintaining the IT resources used to plan and conduct AOC missions. Air Force Test and Evaluation Center (Detachment 1) will perform test flights. Projected cost avoidances: O&S (\$929k/year).

**Current Capability****Upgraded Capability****Cost Effective Light Aircraft Missile Protection****Sponsor: USAF and USSOCOM****Vendor: Raytheon Missiles, Tucson, AZ, and Northrop Grumman, Chicago, IL**

CELAMP is designed for very light, tactical platforms such as AH-1Z helicopter and the F/A-18 fighter, as well as for larger cargo aircraft. It is considerably smaller, lighter than older generation systems and cost considerably less. Performance is improved by an exceptionally fast and accurate laser-pointer developed from the fielded AIM-9X missile seeker. CELAMP estimates a 166% performance enhancement over currently fielded IRCM systems for smaller tactical aircraft such as A-10s in multi-shot threat scenarios. Operational benefits from CELAMP are: improved operating MTBF, significant reduction in total system weight, and production-ready hardware that can be quickly fielded in either podded or distributed configurations. Since CELAMP leverages production AIM-9X and AAQ-24 (V) systems, fielding times and unit procurement costs can be dramatically reduced. Estimated cost avoidances: RDT&E (\$700 million) and procurement cost avoidance (\$200 million) with fielding reduction of 5+ years.

**DIRCM
Pointer****Jamming Laser****System Controller****Low Plasticity Burnishing to F100 Airfoils****Sponsor: USAF, AFRL****Vendor: Lambda Technologies, Cincinnati, OH**

This project seeks to eliminate the substantial maintenance burden of unscheduled engine removals caused by foreign object damage (FOD). The potential for FOD ingestion and resultant engine damage is a serious safety and operational threat to the warfighter. The objective can be accomplished, in a cost-effective manner, by using low plasticity burnishing to induce FOD mitigating deep compressive stresses in vulnerable F100-220 stage 4-6



PROJECTS SELECTED FOR FY2007

Defense Acquisition Challenge Program FY 2006

compressor blades. Testing will be conducted at Tinker Air Force Base, Oklahoma. Estimated cost avoidances: O&S (\$144 million) with a procurement potential of 1,700 engine sets estimated at \$10.6 million.

U.S. SPECIAL OPERATIONS COMMAND

Crew Served and Heavy Weapons Aiming Laser

Sponsor: SOCOM PEO SOF Warrior

Vendor: B. E. Meyers & Co., Inc., Redmond, WA; Insight Technology, Londonderry NH; Night Vision Equipment Co., Allentown, PA; Laser Devices Inc., Monterey, CA

The Crew Served and Heavy Weapons Aiming Laser (CSHWAL) is a small lightweight, highly effective laser pointing and aiming system to facilitate both day and nighttime operations for crew served and heavy weapons platforms. The CSHWAL is based on commercial-off-the-shelf and non-developmental items that will require only minor modification prior to fielding for combat. The CSHWAL will increase the SOF warfighter's survivability and lethality by enhancing weapon performance and target acquisition. Estimated cost avoidances are: RDT&E (\$4 million), manufacturing (\$4 million), and O&S (\$2.5 million). Comparative testing is being conducted at NSWC Crane, IN.

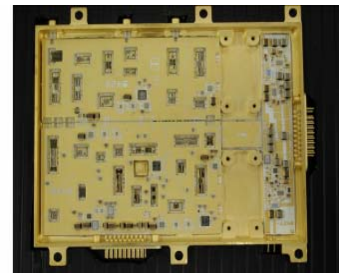


Improvements to Suite of Integrated Radio Frequency Countermeasures Systems

Sponsor: SOCOM Technical Application Program Office

Vendor: ITT Industries, Clifton, NJ

Technology advances have made gallium arsenide (GaAs) high-frequency RF Amplifier chips commercially available. They can reduce bare component costs as well as reduce test and tuning time for microwave component assemblies (MCA's) within the AN/ALQ-211 Suite of Integrated Radio Countermeasures (SIRFC) system. This demonstration will validate that commercially available GaAs RF insertions can replace the current MCA's and reduce test and tuning times. Significant cost savings could be realized for upcoming manufacturing, assembly and sustainment of the ALQ-211 SIRFC on MH-47, MH-60, CV-22 and other DoD aircraft applications. Estimated cost avoidances are: RDT&E (\$1 million), O&S (\$1.58 million) and estimated procurement cost avoidance (\$8.28 million).

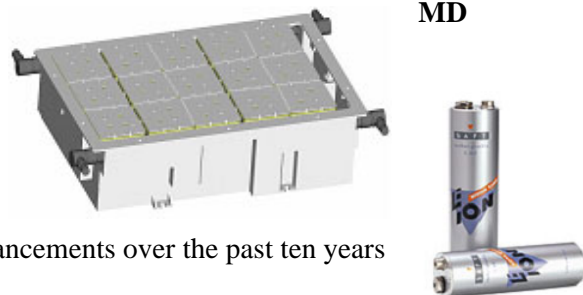


Lithium Ion Battery System for MK8 SEAL Delivery Vehicle

Sponsor: SOCOM PEO Naval systems

Vendor: SAFT America, Inc., Cockeysville,

A Lithium Ion (Li Ion) energy storage system upgrade for the SEAL Delivery Vehicle (SDV) from the current Silver Zinc (Ag Zn) battery cells originally designed for SDV use in the 1970's. The Ag Zn system is insufficient to meet the power demand driven by several SDV enhancements over the past ten years



MD

PROJECTS SELECTED FOR FY2007

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(increased navigational accuracy, situational awareness, and communications). Ag Zn batteries are being pushed beyond designed capability; Li Ion can be fit and charged in current space and exceed foreseen requirements. Testing will be conducted by DON, Naval Ordnance Safety & Security Activity (NOSSA). Final Safety Testing is ongoing; final approval will be coordinated between NSWC Crane, IN, and NOSSA. Estimated cost avoidances: RDT&E (\$5 million), manufacturing (\$2 million), procurement (\$5 million), and O&S (\$1 million).

Modular Advanced Composite Armor Kits for SUVs

Sponsor: SOCOM PEO SOF Warrior

Vendor: Battelle, Columbus, OH; Hawthorne & York, Phoenix, AZ

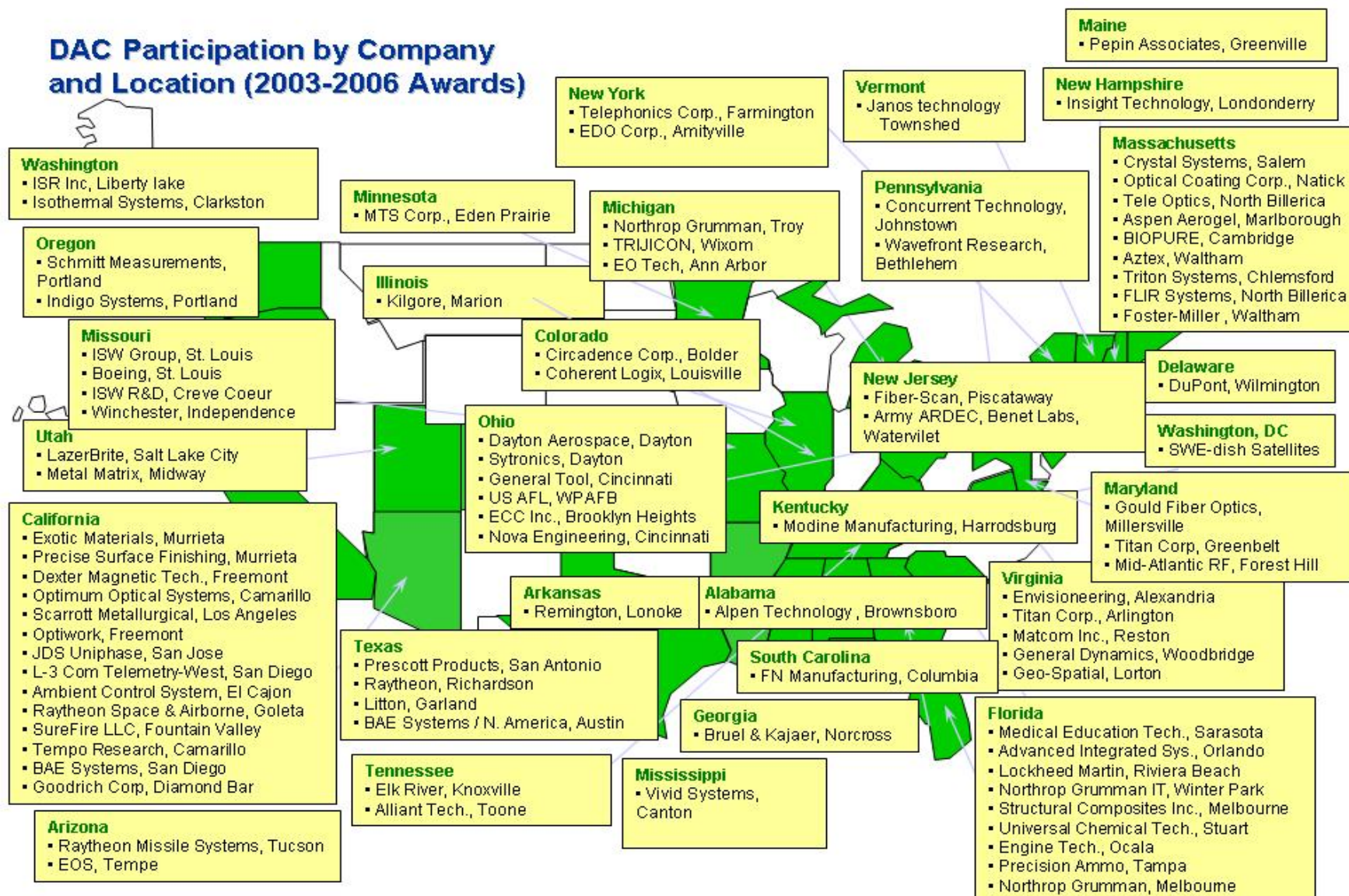
The technology to be tested is lightweight, advanced composite armor for SUVs and Special Operations Forces (SOF) Non-Standard Civilian Vehicles. The armor can be easily installed and repaired in the field by non-technical personnel without special tools or equipment. Modular fit and design kits can be produced for different threat levels up to and including National Institute of Justice Level IV/NATO-STANAG Level 3 protection from small arms and antipersonnel fragmentation mines. This technology will provide immediate force protection and increased survivability for SOF warfighters prosecuting the Global War on Terrorism. Testing will be conducted at Aberdeen Proving Ground, Maryland. Estimated cost avoidances: RDT&E (\$61 million), manufacturing (\$3.75 million), O&S (\$.024 million) and with a fielding reduction of 2+ years.



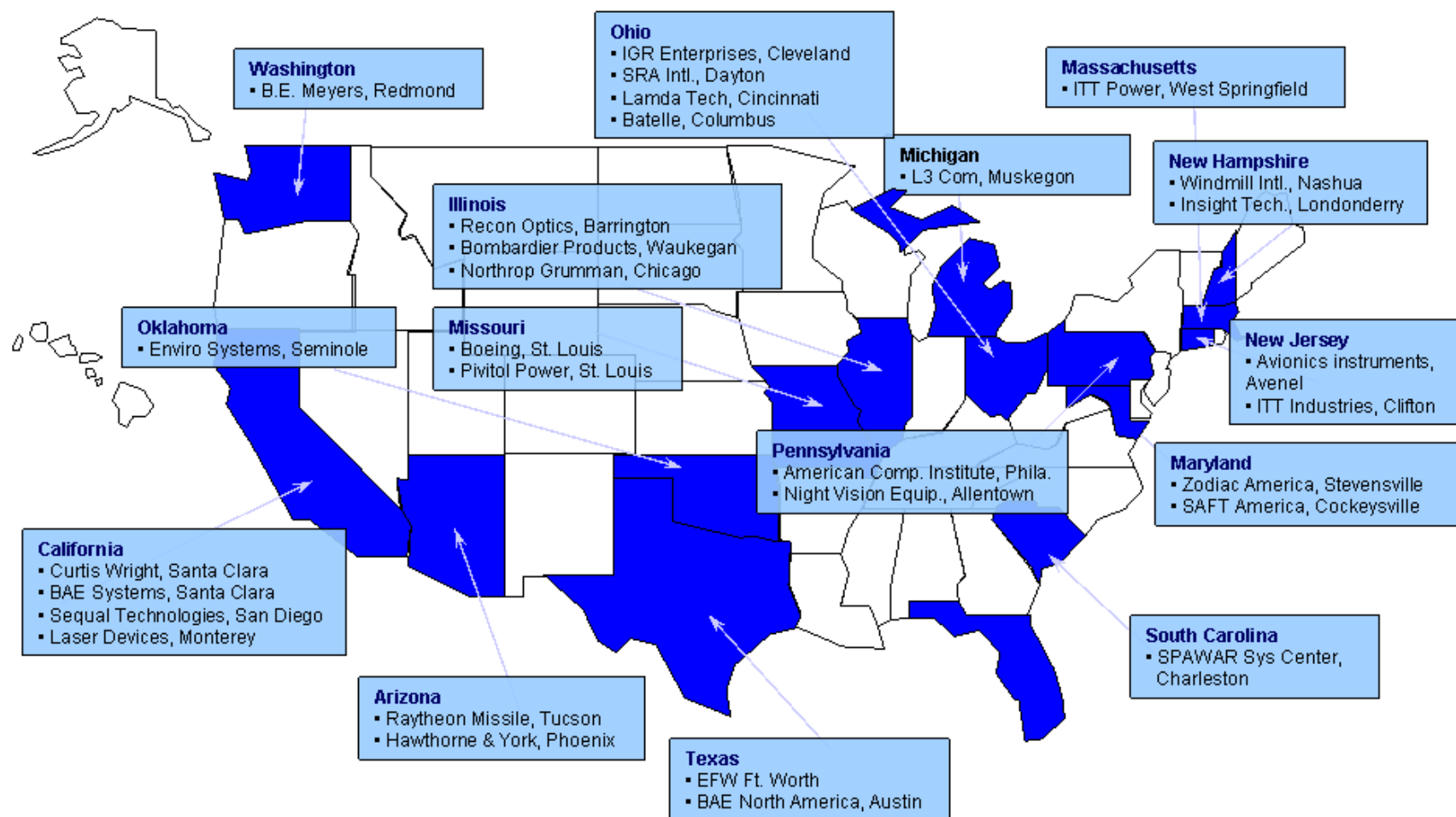
APPENDIX A

PARTICIPATION IN THE DAC PROGRAM

(Figure A-1)



Participation by Company and Location FY 2007 Awards



DoD PARTICIPATION IN THE DAC PROGRAM

The principal objective of the DAC Program is to equip the U.S. warfighter with the world's best equipment. Evaluating non-developmental items with potential to satisfy U.S. defense requirements does this more quickly and economically. Table A-1 lists the participation of each of the Services and SOCOM in the DAC Program through the end of FY 2006.

Table A-1. DoD PARTICIPATION IN THE DAC PROGRAM (FY 2003 – 2006)

Sponsor	Total Projects FY 2003-2006	Projects Meeting Requirement FY 2003-2006	Projects Resulting in Procurements
Army	15	6	4
Navy and Marine Corps	20	6	3
Air Force	16	5	4
USSOCOM	17	8	3
Totals	68	25	14

From projects initiated from FY 2003 – 2006:

- 56 percent of those completed and satisfying testing requirements are being procured
- 36 percent of those completed met Service / Agency requirements

APPENDIX B

**EQUIPMENT SELECTED FOR PROCUREMENT
AS A RESULT OF THE DAC PROGRAM**

**Table B-1. EQUIPMENT SELECTED FOR PROCUREMENT
ARMY (FY 2003 - 2006)**

Equipment	Company	Location	Year
Mini-Combat Trauma Patient Simulation System	Medical Education Technologies Inc.	Sarasota, FL	2003
SprayCool Counter Targeting System	Isothermal Systems Research	Liberty Lake, WA	2003
Trans Critical Co2 Environmental Control System	Modine Manufacturing	Harrodsburg, KY	2003
Enhanced Simulation Capabilities for Testing and Training	Circadence Corporation	Boulder, CO	2003

**Table B-2. EQUIPMENT SELECTED FOR PROCUREMENT
NAVY / MARINE CORPS (FY 2003 - FY 2006)**

Equipment	Company	Location	Year
Automated EPLRS Planner	Northrop Grumman	Winter Park, FL	2003
SPEED QoS	Northrop Grumman	Winter Park, FL	2003
Spray Cool Technology for Close-In Weapon System Power Amplifier	Isothermal Systems Research	Liberty Lake, WA	2005

**Table B-3. EQUIPMENT SELECTED FOR PROCUREMENT
AIR FORCE (FY 2003 - FY 2006)**

Equipment	Company	Location	Year
Integrated Scheduling for Global Hawk	Dayton Aerospace	Dayton, OH	2004
Quiet Eyes Low-Cost Directed Infrared Countermeasures	Raytheon Missile Systems	Tucson, AZ	2005
Global Transponder Improvement Using COTS Digital Video Broadcasting	ECC Inc.	Brooklyn Heights, OH	2005
Low-Frequency Synthetic Instrument Measurement and Stimulus System	BAE Systems Mission Solutions	San Diego, CA	2005

**Table B-4. EQUIPMENT SELECTED FOR PROCUREMENT
SPECIAL OPERATIONS COMMAND (FY 2003 - FY 2006)**

Equipment	Company	Location	Year
SOPMOD Shock Profile Database	Bruel and Kjaer Testing Support	Norcross, GA	2003
Embedded Integrated Broadcast Service (EIBS) Receiver	L3 Communications Telemetry West	San Diego, CA	2003
Second Generation Rail Interface System for M-4 Carbine	Daniels Defense	Savannah, GA	2005

APPENDIX C

**EXAMPLES OF DAC-EVALUATED EQUIPMENT
SUPPORTING U.S. MILITARY OPERATIONS**

EXAMPLES OF DAC-EVALUATED EQUIPMENT SUPPORTING U.S. MILITARY OPERATIONS

Operation:	Operation Iraqi Freedom (OIF)
Project:	SprayCool Counter-Targeting System
Company:	Isothermal Research Inc.
Location:	Liberty Lake, WA
Description:	The fluid-cooled CPU's operated extensively and with great success, especially by security forces for protection of fixed installations.
Operation:	Operation Iraqi Freedom (OIF)
Project:	Enhancements to Fly Away Satellite Communications (SATCOM)
Company:	Swe-Dish Inc.
Location:	Reston, VA
Description:	Since the summer of 2003, the Fly Away SATCOM System has been employed in the mountains of Afghanistan and the deserts of Iraq with unsurpassed successes.
Operation:	Operation Iraqi Freedom (OIF)
Project:	MK-46 Machine Gun Semi-Rigid Ammunition Containers
Company:	FN Herstal
Location:	Reston, VA
Description:	Semi-rigid carriers provide quieter ammo carry under covert conditions and are more durable than previously standard containers. SOF world-wide protects linked ammunition for the M249 Squad Automatic Weapons with these.
Operation:	Operation Enduring Freedom / Operation Iraqi Freedom
Project:	Mini-Combat Trauma Simulation System
Company:	Medical Education Technologies, INC.
Location:	Sarasota, FL
Description:	System improves skills of combat medical personnel deployed forward in mass casualty and triage, with quicker assessments of battlefield casualties to increase warfighter survivability. Over 400 medics have been trained with this simulation system.
Operation:	Operation Enduring Freedom/Operation Iraqi Freedom
Project:	Enhanced Gunfire Detection
Company:	Various
Location:	Various
Description:	This enhanced system, worked with seven domestic vendors, adds sensors, processors, and automated processing cements to locate a threat prior to the sniper's first shot. A prototype system has already been fielded. A e-mail dated April 29, 2005, from the 116th Brigade Combat Team Logistics Assistance Representative reported that one week after the EGDS was set up in an operational high-risk area of Iraq, rounds were fired by insurgent snipers at soldiers in the camp. The EGDS performed as advertised and identified distance and bearing of the fire. Subsequent search of location resulted in the capture of insurgents and weapons—no soldiers were injured.

APPENDIX D
ABBREVIATIONS
&
ACRONYMS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AAAV	Advanced Amphibious Assault Vehicle
ACM	Adaptive Coding and Modulation
AE	Antenna Electronics
AF	Air Force
AF	Angel Fire
AFB	Air Force Base
AFRL	Air Force Research Laboratory
AgZn	Silver Zinc
AH-1Z	Attack Helicopter
APD	Awaiting Procurement Decision
AS&C	Advanced Systems and Concepts
AT&L	Acquisition, Technology and Logistics
AWACS	Airborne Warning and Control System
AWIS	Airborne Wireless Intercommunications System
BAA	Broad Agency Announcement
C2	Command and Control
CATT	Combined Arms Tactical Trainer
CC	Combatant Commander
CECOM	Communications Electronics Command
CELAMP	Cost Effective Light Aircraft Missile Protection
CD	Continuous / Discontinuous
CL	Cutaneous Leishmaniasis
CMC	Ceramic Matrix Composite
CMD	Countermeasure Dispenser
CO ₂	Carbon Dioxide
CoBRA	Compact Broad Band Antenna
COMOPTEVFOR	Commander Operational Test and Evaluation Force
COTS	Commercial Off-The-Shelf
CRRC	Combat Rubber Reconnaissance Craft
CSHWAL	Crew Served and Heavy Weapons Aiming Light
CTO	Comparative Testing Office
CTP	Common Tactical Picture
CTPS	Combat Trauma Patient Simulation
CTS	Counter Targeting System
DAC	Defense Acquisition Challenge Program
DCIN	DoD Cooperative Integrated Network
DDD	Digital Depth Detector
DDG	U.S. Navy Destroyer
DD(X)	U.S. Navy Destroyer (Class Not Yet Identified)
DIRCM	Directed Infrared Counter Measures
DIS	Distributed Interactive Simulation
DoD	Department of Defense
DSP	Digital Signal Processing
DUSD	Deputy Undersecretary of Defense
DVB-S	Digital Video Broadcast-Satellite
EA	Electronic Attack
EFV	Expeditionary Fighting Vehicle
EGDS	Enhanced Gunfire Detection System
EGLM	Enhanced Grenade Launcher Module

EIR	Embedded Integrated Receiver
ELINT	Electronic Intelligence
EMS	Energy Management System
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPLRS	Enhanced Performance Location Reporting System
FASS	Flyaway SATCOM System
FCB	Functional Capability Board
FEP	Firepower Enhancement Program
FOD	Foreign Object Damage
FOTD	Fiber Optic Towed Decoy
FSP	Friction Stir Process
FTTS	Future Tactical Truck System
FY	Fiscal Year
GaAs	Gallium Arsenide
GBS	Global Broadcast Service
GN&C	Guidance Navigation and Control
GPS	Global Positioning System
GSK	Ground SIGINT Kit
HAHO	High Altitude High Opening
HALO	High Altitude Low Opening
HEPT	High Energy Photovoltaic
HMMWV	Highly Mobile Multi-purpose Wheeled Vehicle
HPSADA II	High Performance Standard Advanced Dewar II
IBS	Integrated Broadcast Service
ICAN	Interim Capability for Airborne Networking
IIS/SP	Intelligence and Information System/Special Projects
I-MTS	Integrated MOUT Training System
IP	Information Protocol
IPIM	Integrated Pointer/Illuminating Module
IR	Infrared
IR-TFFI	Infrared Thermal Friendly Force Identifier
ISR	Isothermal Systems Research
JTRS	Joint Tactical Radio System
JTWS	Joint Threat Warning System
LAIRCM	Large Aircraft IR Countermeasures System
LAV-25	Light Armored Vehicle
LED	Light Emitting Diode
LiIon	Lithium Ion
LPD	U.S. Navy Amphibious Assault Ship
LRU	Lower Replaceable Unit
MATT	Mission Advanced Tactical Terminal
MBT	Main Battle Tank
MCA	Microwave Component Assemblies
MCRPA	Miniature Controlled Receive Pattern Antenna
MDNS	Miniature Day/Night Sight
MEDEVAC	Medical Evacuation
MOTS	Military-off-the-shelf
MOUT	Military Operations in Urban Terrain
MTBF	Mean Time Between Failure
NAVAIR	Naval Air Systems Command

NAVSEA	Naval Sea Systems Command
NBOE	Non-Gasoline Burning Engine
NDI	Non-Developmental Item
NSCT-1	Navy Special Clearance Team - 1
NSWC	Navy Surface Warfare Center
OIF	Operation Iraqi Freedom
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
O&S	Operations and Support
PCOCA	Portable Continuity Operations Communications Appliance
PEO	Program Executive Office
PFB	Pseudofolliculitis Barbae
PM	Program Manager
PPDS	Precision Parachute Delivery System
PVI	Pilot Vehicle Interface
QoS	Quality of Speed
RAM	Rolling Airframe Missile
REHA	Reduced Environmental Hazard Ammunition
RESUS	Restore Effective Survival in Shock
RFID	Radio Frequency Identification
RHIB	Rigid Hull Inflatable Boat
RPG	Rocket Propelled Grenade
RPRS	Rucksack Portable Receiver Suite
R&D	Research and Development
SATCOM	Satellite Communications
SCATT	Soldier Combined Arms Tactical Trainer
SDV	Seal Delivery Vehicle
SEI	Specific Emitter Identification
SIGINT	Signal Intelligence
SIMSS-LF	Synthetic Instrument Measurement and Stimulus Low Frequency
SIMSS-RF	Synthetic Instrument Measurement and Stimulus Reduced Frequency
SIRFC	Suite of Radio Frequency Countermeasures
SOCOM	United States Special Operations Command
SOF	Special Operating Forces
SOPMOD	SOCOM Special Operations Peculiar Modifications
SOTVS	Special Operations Tactical Video System
SPAWAR	Space and Warfare Systems Command
SPO	System Program Office
SPEED	System Planning Engineering and Evaluation Device
TAC	Total Accumulated Cycles
TESA	Titanium Encapsulated Skirt Armor
TRSS	Tactical Remote Monitoring System
UGS	Unattended Ground Sensors
UH-1Y	Utility Helicopter
U.S.	United States
USMC	United States Marine Corps
USV	Unmanned Surface Vehicle
UUC	Unmanned Underwater Vehicle
VAVD	Vacuum Arc Vapor Deposition
VBL III	Visible Bright Light, Third Generation

VEN	Variable Exhaust Nozzles
VERTS	Virtual Emergency Response Training System
WAPR	Web Assured Response Protocol
WDM	Wavelength Division Multiplexing
WMD	Weapons of Mass Destruction

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